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**On the Winning and Working of Collieries.**

BY MATTHEW DUNE, MINING ENGINEER.

IRELAND.—Tighe, in his survey of Kilkenny, gives a very striking description of the evil effects of bad ventilation, &c., upon the fresh colliers. "The colliers are, independent of accident, unhealthy and short-lived, they seldom arrive at 50 years of age; a consumption of the lungs is the disorder of which they generally die, for a year or two before which event they often throw up black spittle. Those who work in wet pits live longest, as they do not swallow so much of the volatile dust of the coal; many do not survive it for 10 years, though there are peculiar instances of workmen who have been in the colliery for 40. The passages are narrow and low, in many places there was scarcely room to crawl."

The collieries in the north of England, with scarcely a single exception, are admitted to be well established in ventilation. Before concluding the section upon ventilation, I think it will be well to bring under notice the printed report, addressed to Sir George Grey, in 1847, of Mr. Tremerehere, one of the sub-commissioners, whose investigations were instrumental in producing the bill of Lord Ashley in 1843, and who has since that period been employed by the Government to traverse the coal districts, and report the result of the Act.

Mr. Tremerehere commences by saying—"I have availed myself of every opportunity that came in my way of gathering the opinions of owners and managers of collieries, colliery viewers, mining engineers, and other persons possessing scientific or practical knowledge, or both, as to whether it might be possible, by any aid or interposition of the Government, to diminish the risk of those colliery explosions. I, therefore, venture to lay before you the conclusions I have arrived at, after the opportunities I have had of considering them in reference to all the principal coal districts in the kingdom. I beg, therefore, to submit to you, that the only kind of inspection on the part of the Government which would not be liable to grave objections, would be inspection without compulsory powers of interference, and that such inspection, conducted by gentlemen uniting scientific with practical knowledge, would tend to diminish the frequency of colliery explosions."

He reasons thus—"The circumstances of individual collieries must necessarily vary so greatly, and the conditions under which they can be profitably worked are so numerous, depending upon the position and value of the coal, the tenure, the amount of dues and royalties, the command of markets, &c., that an expense for the purpose of ventilation, which might easily be borne by one work, might render the neighbouring one profitable; and to confer upon an officer of the Government a power of causing the proprietors to conform to particular details in the ventilation, would be to transfer the responsibility for their safe and proper management from the proprietors to the Government. It would have appeared to me unnecessary to allege such simple and obvious reasons against the proposition of inspection armed with compulsory powers, had I not occasionally found, among persons in the mining districts, an expectation that it might be used with advantage towards the protection of life. In the course of my inquiries, I have been struck with the marked difference in point of care and skill very frequently shown in the management of adjoining collieries. In some the plans are kept with care and exactness, and the whole management betokens the skill and carefulness of the mining engineer. In others, worked under precisely the same local circumstances, the plans are neglected, and are many weeks or months in arrears of their workings, and the mode of ventilation is defective, as compared with the former, in many important particulars. Some persons filling those situations are men of considerable information and intelligence, and have had the advantage of an education specially preparing them for such duties. Many others, however, are quite the contrary, carrying on their works with a mere unthinking acquiescence in the mode of ventilation that they have been accustomed to, and neglecting to avail themselves of means of information which would, at a very insignificant cost, render their collieries comparatively safe. In such cases it generally happens that, after some frightful loss of life, steps are taken to improve the ventilation, which steps, had they been resorted to before, would have obviated the danger; yet adjoining collieries will be found still to remain in the same state as before." Thus Mr. Tremerehere enumerates the various particulars in which a colliery may be unsafe and wanting in ventilation, although to place it upon a proper footing might only require a very insignificant cost.

As to his remarks, that "collieries differ so extremely from each other in respect of the position and value of the coal, the tenure, the amount of royalties, the command of markets, &c.," I am at a loss to conceive why such subjects should have any bearing upon the question of safety to the people. If a Government inspector understood the subject, he would deal with it rationally, and draw a discretionary line; but if he acted with compulsory powers, his orders would be carried into effect, or appealed against upon the responsibility of the party objecting; it matters not to the people who lose their lives, whether it is brought about by the ignorance, the cupidity, or the obstinacy of the colliery proprietor. Mr. Tremerehere admits that such a state of things prevails, and that Government inspection would tend to good; therefore, the only question is, whether the official would best correct such abuses with or without compulsory powers.

The Government Inspector (according to Mr. Tremerehere) would go through each colliery with the mining engineer, and examine the course of the air, its volume, the rapidity of its current, its condition, the contrivances for directing it in its proper channels, the width of the communications, whether large enough to bring a proper supply to the places of work, and various other details.

"Amongst the great number of persons engaged as proprietors or lessees in working, or as mining engineers in managing collieries, with whom I have conversed, I have met with none who would not receive candidly and thankfully, any remarks that a gentleman of ability found it incumbent on him to make. These remarks to be first addressed as confidential communications; subsequently, a general report of the state of the ventilation in the collieries of a particular district, might be addressed to the Government, which need only be made public."

So then, Mr. Tremerehere conceives that, upon the bare suggestion of the Government engineer, coal managers are to give up all the prejudices of custom, that they are to be suddenly enlightened even to conviction, that they are moreover to be willing to expend money in adopting the suggestions of the inspector, even against their own sense of interest or necessity. Perhaps they have their working let to contractors or practical colliers, who must needs be reconciled. But why should the colliery owner be so ready to believe that this inspector is a good and discreet judge of the proper manner of working or ventilating a seam, in the like of which he has had little experience? Mr. Tremerehere omits to tell us what must be done in case of refusal, except reporting to the Government. If so, let us suppose that whilst the controversy goes on, and weeks elapse, an explosion takes place, and lives are lost, who is to be made responsible? The Act of Lord Ashley was decisive against the employment of women and boys under 10 years of age; and Mr. Tremerehere was sent round the mining districts, to see whether the coal owners were acting up to it. The very first opening of his report, referring to the South Wales district, says—"A few convictions had taken place during the year for employing females underground, and recently, in consequence of my representations and the probability of legal proceedings, upwards of 30 women were discharged from the collieries of the Rymney Company." "Nevertheless, the disposition is so strong among some of the colliery population to disregard the Act, that the services of a constable to watch the suspected pits from time to time are necessary." The employment, underground, of boys under 10 years of age, still exists to a considerable extent in this and other mineral districts. Several convictions have been obtained, but a permanent effect cannot be expected until some operating check is brought to bear upon a practice which the Legislature has sought to discourage.

I cite the above passages for the purpose of showing, that by Mr. Tremerehere's own report, where the colliery proprietor fancies his interest at variance with the Act of Parliament, he may be anxious to evade it. Although Mr. Tremerehere disapproves of compulsory powers, he adds—"I beg to add this further suggestion, that it should be made compulsory to report to the Secretary of State all fatal accidents arising from explosions in collieries." Mr. Tremerehere, therefore, comes to the conclusion, that the intercourse which would take place between the Government Inspectors and the owners and managers of collieries would adequately meet the case, without any compulsory powers, as to either stopping the works or inflicting penalties; but he does not seem to appreciate sufficiently the consequences of a colliery being allowed to work in so dangerous a state as to produce explosion during the controversy, or because the colliery owner does not promptly carry into effect the suggestions of the inspector. In such a case, I apprehend the deficiency of the Act would be so apparent, that the first coroner's jury who sat would recommend it to be amended, by adding compulsory powers.

(To be continued in next week's Journal.)

**The Metallurgical Treatment of Ores.**By JOHN MITCHELL, Esq., F.C.S., author of *A Manual of Practical Assaying, &c.*

No. XXXII.—(Continued from February 17.)

In the last paper it was stated that carbon could exist in three different states in iron. It may also exist in one, two, or all three of these states in the same sample. Thus, by the action of acids on grey iron, we can obtain pure carbon (graphite), which entirely consumes at a red heat, leaving no residue; the substance we have termed "polycarburetted," which, on burning, leaves a certain per centage of oxide of iron, and the black pulverulent substance which, in combustion, gives no oxide of iron—showing it to be pure carbon. This substance is always obtained from tempered steel and white iron.

It sometimes happens, however, that but the two first are contained: this occurs with pure grey or black iron, but all three are present in mottled iron—thus showing black or grey iron to be a malleable iron, or tempered steel (according to the amount of combined carbon), in which is crystallised a certain per centage of graphite; mottled iron, on the contrary, giving all the three varieties of carbon, may be assumed to be a mixture of malleable iron, or an untempered steel, with a certain amount of white iron, or tempered steel, which is added crystallised carbon or graphite.

Malleable iron and untempered steel are here classed together, because they give, on solution in acids, the same variety of carbon—merely differing in quantity. The same holds good with white iron and tempered steel, but the variety of carbon is different, as well as the quantity. The carbonaceous matter produced by the solution of malleable iron and tempered steel is attracted by the magnet, and leaves a residue on burning, which is oxide of iron—thus showing the substance in question to be a carburet of iron. On the other hand, the carbonaceous matter produced by the solution of tempered steel and white iron is not attracted by the magnet, and leaves no residue on burning—proving it to be pure carbon. The polycarburetted, or definite carburet of iron, is not decomposable by some acids, and thus assimilates itself in its nature with the phosphate of iron, or siderite, already treated of.

Whilst on the subject of the state of existence of carbon in iron, it may be remembered I stated, in reply to a letter of Mr. R. Mushet's, that combined carbon did not take up oxygen from oxide of iron, and that it was only the free carbon possessed this property; this was an error, to which I will shortly call attention—showing how I was induced to believe this at that time.

It may also be remembered, that throughout this series of papers, as well as a correspondence which appeared in the Journal, about a year since, I have maintained that grey iron contains less carbon than white. This I must again assert, in connection with the general run of marketable iron; but, at the same time, must admit that, under certain circumstances which do not occur in the ordinary iron furnaces, grey iron may be made to contain much more carbon than any sample of white. This exception, however, only goes to prove my rule, as I hope shortly to show. One thing, however, is positively certain, that white iron invariably contains more combined carbon than any sample of grey, and that the presence of the remainder of the carbon in the latter must be owing to some peculiar circumstance, to be accounted for only in the same manner as some of the singular anomalies in solution and crystallisation.

Thus, for instance, 5 parts of dry sulphate of soda dissolve in 100 parts of water, and at 92°, 100 parts of water dissolve 92 parts of the same salt, but at temperatures higher than that it is less soluble; therefore, a saturated solution, made at 92°, will, on being heated—say, to 230°—only retain in solution about 43 parts of the salt, therefore 9 parts are deposited in the crystalline state. Now, it appears to me, that a solution of carbon in iron may be precisely in this state. A furnace producing white iron is not required to be at so high a temperature as a furnace which produces a grey iron, and may not the relations of carbon and iron be similar to the relations of dry sulphate of soda and water, so that, at a certain definite temperature, iron takes up a certain amount of carbon (the greatest hitherto found in white iron is about 5.5 per cent.); if this compound can be subjected to a higher temperature under favourable circumstances, it seems probable that, as with the sulphate of soda, so it might be with the carbon, and that the latter should be precipitated from its solution, forming grey iron, so that the higher the temperature in the furnace, the more carbon would be precipitated—the less combined carbon would exist in the metal, and the darker the latter would become.

In this way, to a certain extent, might also be explained, why ordinary commercial grey iron contains less absolute carbon than white iron. We may suppose, after the precipitation of carbon by heat, that it is exposed for a time, not only to a portion of free oxygen from the tuyère, but also in a higher part of the furnace to a portion of undecomposed carbonic acid; in either of these cases, a loss of carbon would ensue, in the first case, by direct oxidation, and, in the second, by the decomposition of carbonic acid, by the assumption of one atom of carbon, and the formation of two atoms of carbonic oxide. Of course, these are only hypotheses, but they seem capable of explaining the formation of grey iron, as well as its usual deficiency of carbon, as the part lost plays in the operation, accounting why in one, white iron and in another, grey iron should result.

The reason that grey iron may contain less carbon than white iron can also be explained in the following manner. Generally speaking, the iron produced by charcoal furnaces is richer in carbon and poorer in silicon and the bases of the alkaline earths, than that produced by coke furnaces. This seems, again, to be owing entirely to temperature. Thus the carbon, precipitated by a high temperature in its crystalline form, from solution in iron (or carbon in the nascent state), may be combined, at the great degree of heat at which it is at the time of its separation, to reduce silicon, magnesium, calcium, &c., from the slag with which it and the metal is in contact, the carbon itself thus being oxidised, and the reduced metals alloying with the iron. This would be explained why coke iron should contain more silicon, magnesium, calcium, &c., than charcoal iron, and, consequently, more carbon, for it is found in practice that the denser the fuel, the higher the furnace, and the stronger the blast, the more silicon, &c., will the iron contain, and in general the less carbon. The following analyses will prove this position; as well as others, which will be hereafter cited. The three now appended, and due to Mr. Karsten, throw much light on this subject—showing what modifications the various products can undergo.

They were made at the works at Hamn, where the mine is fused without addition of calcareous matter, and where, consequently, the only variation that could be made in the working would be the relation between the charges of mine and fuel.

In the three experiments, during the execution of which were produced the substances for analysis, the quantity of mine was augmented in the following proportions, 2, 3, and 4, the fuel remaining the same.

	1st EXPERIMENT.	2d EXPERIMENT.	3d EXPERIMENT.
	Grey Iron.	Lamellar White Iron.	Granular White Iron.
Iron	86.739	89.738	94.316
Manganese	7.420	4.455	1.790
Silicon	1.310	0.550	0.000
Graphite	2.371	0.000	0.000
Combined carbon	2.080	5.140	3.910
Sulphur	0.001	0.002	0.010
Phosphorus	0.080	0.080	0.080
	100.000	100.000	100.000
Slag of same.	49.57	48.39	37.80
Silica	0.00	0.06	2.10
Alumina	0.04	0.06	31.50
Peroxide of iron	35.84	33.96	29.20
Peroxide of manganese	15.15	10.22	8.60
Magnesia	0.08	0.08	0.02
Sulphur	99.98	99.97	99.92

The following conclusions may be drawn from these analyses:—  
Firstly.—That whatever may be the composition of non-calcareous slags, the whole of the phosphorus is found in the iron. It may be said, even of very calcareous slags, that the metal given, contains traces of phosphorus, on account of the phosphates in the fuel employed (with pure mine, however, and coke, less phosphorus would be found in the metal than with charcoal, because wood in general contains much more phosphoric acid than coke).

Secondly.—It is not so with sulphur, which passes into the slags as sulphuretted calcium or magnesium—forms incompatible with the presence of peroxide of iron in the matters; so that the loss undergone by leaving the iron in contact with such slags is not the only inconvenience—the iron is sure to be sulphurised, so that the greatest attention ought to be paid to this point.

Thirdly.—The reduction of manganese takes place only in presence of a very large amount of carbon. It is nearly absent in the iron, when there is a tolerable quantity of peroxide of iron in the slag.

Fourthly.—The silicon increases with the temperature, as shown by the analyses. A consideration of the state in which carbon exists in grey and white-iron will also explain their physical properties. Grey iron is tolerably malleable, and easily submits to the file; white iron is brittle, and resists the file. The first, according to our hypothesis, is a mixture of either malleable iron or untempered steel, whose particles are divided by an admixture of crystallised carbon; the latter a species of iron containing its carbon in exactly the same condition as tempered steel—hence their evident difference in behaviour under the hammer and file. The following analyses will point out the composition of some kinds of grey-iron:—

	Grey Iron from Sayer, near Coblenz, fuel charcoal, mine brown oxide	Grey Iron from Widdersheim (Siegen), fuel charcoal, mine mixture of brown oxide and spathose iron (Stahleisen)	Grey Iron from Malapane (Upper Silesia), fuel charcoal	Grey Iron from the Königshütte, fuel coke, mine brown ochreous oxide
	0.89	3.71	4.60	
Carbon	1.03	3.63	4.65	
Silicon	0.75	3.15	3.90	
Manganese	0.58	2.37	3.15	

**GREY IRONS (CHARCOAL).**

	Campanie.	Nivernais.	From mixture of coke & charcoal (Berry).
Carbon	2.100	2.254	2.319
Silicon	1.060	1.030	1.920
Phosphorus	0.869	1.043	0.188
Manganese	trace	trace	trace
Iron	95.971	95.673	95.673
	100.000	100.000	100.000

**GREY IRONS (COKE).—WELSH.**

	Ancy-le-Franc.	Autrey.	Torgow.	Perts.	Alloy.
Carbon	2.400	3.560	2.600	1.900	3.060
Silicon	1.200	0.300	0.400	0.900	0.000
Manganese	—	—	2.900	0.900	1.900
Phosphorus	—	—	3.100	5.600	0.300
Iron	96.400	96.200	91.100	91.400	94.900
	100.000	100.000	100.000	100.000	100.000

**GREY IRONS (COKE).—WELSH.**

	2.450	2.550	1.600	3.000	0.400	0.900	0.300
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	Franch Compté.	Cremat.	Janon.	Charleroi.	Engish.
Carbon	2.800	2.031	4.300	2.300	2.300
Silicon	1.160	3.490	3.500	3.500	2.300
Phosphorus	6.351	0.604	—	—	—
Manganese	0.689	—	—	—	—
Iron	93.833	92.300	94.200	95.300	—
	100.000	100.000	100.000	100.000	100.000

It will thus be seen, that in 20 analyses of grey iron, as manufactured in the large way, the average per centage of carbon is 2.833. The average of 10 specimens of charcoal grey iron gives  $\frac{2.833}{10} = 2.833$  per cent. of carbon. The average of eight specimens of coke iron gives  $\frac{2.833}{8} = 3.541$  per cent. of carbon; and the average of two specimens of grey iron, smelted by a mixture of coke and charcoal (relative proportions unknown), gives  $\frac{2.833}{2} = 1.416$  per cent. carbon. The average per centage of silicon in 15 specimens of grey iron manufactured in the large way, is 1.738 for the 15. The average per centage of silicon in six samples of charcoal iron is  $\frac{1.738}{6} = 0.289$  per cent. of silicon; and one specimen of iron, smelted by a mixture of coke and charcoal (relative proportions unknown), gave 1.95 per cent. of silicon. On comparing these numbers, it will be found that the observations on temperature, just made are fully carried out, as observed by a comparison of many analyses. It will be seen, that in smelting iron with charcoal, much more carbon, and less silicon, is absorbed than with any of the other specimens. Next come the irons smelted with a mixture of coke and charcoal; and, lastly, the iron smelted by coke alone—the latter showing a considerable deficiency in carbon, and a corresponding increase in silicon. The decrease of carbon in coke iron may be explained satisfactorily by either hypothesis, the increase of silicon by the latter; while it is possible, however, that the reactions mentioned in both may come into play in the decomposition. The remarks concerning the amounts of phosphorus in coke and charcoal iron are also borne out by the appended analyses. This, however, in this case, is only relative, for we have not attached the analyses of the ores smelted, and by that alone could we arrive at a truthful conclusion. The average of four specimens of charcoal iron gives  $\frac{0.604}{4} = 0.151$  per cent. of phosphorus, and the average of five specimens of coke iron gives  $\frac{0.604}{5} = 0.121$  per cent. of phosphorus. [This résumé will be continued in next week's Journal.]

### THE BANK CHARTER ACT OF 1844, AND THE INDUSTRIAL INTERESTS OF THE COUNTRY.

V.—WAGES.

It cannot be inferred, from anything hitherto said, that we undervalue the importance of large capitals in mining and manufacturing. If we have shown that great values are transferred, and that great liabilities are undertaken, in a shape which legislation cannot well control, and which the Bank Charter Act does not touch, we would rather have it inferred that the insufficiency in this Act has been in favour of trade than the reverse. If we have pointed out how small capitals, in countries where credit is limited, are eked out and made to yield the most, we never doubted that where large capitals exist, and are directed with skill, so great is the advantage on their side, that it is scarcely possible to contend against them. It must, therefore, argue great indolence, or great incompetency, if a country rich in capital and credit can be driven from any market by producers of small means and little credit. The expedients resorted to by small capitalists of other countries were not held up as matters deserving of imitation; but solely as a warning to such as seemed to think that a rich country could restrict trade at will, having nothing to fear from competition on the part of poorer neighbours.

The fund out of which wages are paid is in every country composed of that portion of the gains of the industrious, which is employed for further production. It may seem a startling position, but we believe it to be the fact, that in but few countries wages are solely paid in money. When money wages prevail, these sums are almost immediately resolved into the elements of food, lodging, and clothing; so that although a great difference is observable between hired workmen, and domestic labourers fed and clothed with produce raised by their employer, yet it is evident that the advantages afforded by money payments can be dispensed with, when money is too difficult to obtain. The whole of the continent of Europe was, until very recently, tilled by peasants, who paid rent for their own lands by working a certain number of days on the domains of the landlords. Notwithstanding all the efforts of legislators, it has been found so difficult to change this natural system of agreement, where trade was not brisk, that whole districts still adhere to it, although the system has been discouraged by law. In other parts, it reappears where one might think that no impediment to trade existed—as in Ireland in the shape of connacre, or the hiring out of a field against a stipulated return in labour. This, is not effected by any means in the power of either landlord or tenant, employer or labourer, to control. Could any choose, all would be found to prefer money payments, as allowing the greatest liberty to all parties; consequently, where these primitive arrangements, labour rents, connacre, truck, and, we will add, slavery itself, are found, there is good reason at the present day to suspect that the trading arrangements are at fault, rather than that any class of men are desirous of oppressing their fellow-men, or that there should be any propensity to slavish subjection in the mass of a nation.

Were we to accustom ourselves to analyse, in a dispassionate manner, the condition of the various nations around us, we should see on how complicated a machine the prosperity of a country in a high state of development rests. To say nothing of the moral and intellectual growth, and to confine ourselves strictly to the question of earnings, there are clearly two classes of producers to be cared for. These are such as enjoy the benefits of credit, and such as command no credit. The proportions between the two vary in every country. The class enjoying credit is most numerous where there is most wealth, combined with the greatest intelligence. That mere wealth, or natural resources, without intelligence and morality, will not command credit, is testified by the condition of the finest spots in the habitable world: British India, Sicily, Egypt, Asia Minor, Spain, and countless other tracts, abound in productive soils, in minerals, in population; favoured by climate, they possess navigable rivers and harbours of the best description, yet belong to the poorest and most wretched of the known portions of the globe. England, with its damp climate and comparatively barren soil—Holland, an continued swamp—Germany, with a four months' winter and poor soil—are, on the contrary, the seats of successful industry, holding more favoured tracts in subjection, and rivaling in wealth and productiveness the more bustling and less fettered citizens of the United States. In England and Holland, with Belgium, credit has been developed to the greatest extent; both personal and national credit stand highest in these countries. In these alone can the payment of money wages be said to obtain exclusively and universally. The occasional and temporary introduction of the truck system, which has now and then been resorted to, is rather an exception to, than an invalidation of, this assertion. In England, especially, money wages are customary, and to depart from this usage involves a serious privation. Our labourers ought to be made aware of the advantageous position they thus hold above the labourers of other countries; they ought to investigate the reasons for their occupying such a position. It would then not be difficult for them to appreciate the intimate connection subsisting between the capitalists' interests and their own. In England capital has more rapidly accumulated than in other countries; there, too, labour is most highly remunerated, and there the labourer is emancipated from all slavish dependence on his employer, by the fact of his receiving money wages. But another advantage will arise from a dispassionate inquiry into the secret springs of the prosperity of various classes. All will see the special operation of any new or forced system on his own particular interest. If high wages and money payments accompany accumulations of capital, aided by a good development of credit, it is clear that such a system may be shaken in two ways—either accumulations may be discouraged and investments rendered difficult, or obstacles to the free use of credit may limit the efficiency of capital employed in trade. The latter check upon prosperity frequently induces the first mentioned evil. Thus, the Bank Charter Act, by limiting the amount of current coin circulating in the kingdom, throws a difficulty in the way of the money payment of wages. As a necessary consequence, some investments are rendered difficult. Capital, therefore, which under more favourable circumstances would have been invested in domestic enterprise, would have enlarged the labour fund, and would have increased the national accumulations, is driven to seek employment abroad, where either such difficulties do not deter, or a higher rate of profit attracts it. That mining enterprise is more subject than any other to be depressed by difficulties thrown in the way of wages, must not only be felt by all practical miners, but is capable of demonstration from the history of our own times. We have often regretted that discussions like that which has recently sprung up respecting the history of copper smelting, within the present century, should be carried on upon the assumption that the smelter can

gain anything by oppressing the miner, or the miners hope to profit by the smelters' ruin. Does the story of the "Miners' Company" really suggest nothing but a planned war of intestine hostility between miners and smelters? And is there no ear to be lent to the tale of fluctuations brought about by the legislative proceedings with regard to credit, which were going on while the contest, described by Mr. Badd, occurred between that company and the smelting houses. The return to cash payments in 1819, although not to be compared in its effect on individual credit to measures that have since been taken, still occasioned a check. The mischief was modified by the number and activity of the country banks, and wages were less affected by that step than prices. The return to cash payments with country banks of unlimited issue, obliged the dealer or smelter to economise. It reduced profits on manufactured goods, and gave an advantage to private parties, who were hardworking men, and possessed facilities for using personal credit in the shape of bills, over an old proud company which, in all probability, boasted of never having drawn or accepted a bill since its foundation. The resources of private individuals in this respect are more extensive than those of a public company, which is immediately shaken when only suspected of seeking accommodation. Wages, in the meantime, not having suffered from any curtailment of issues, miners were enabled to take advantage of the competition which the new houses started. But matters changed after 1825, and still more after 1844; the limitation of the circulating currency obliged the working miner, in many places, to become a partner in the adventurer's risk, and work is constantly given out on a proportionate contract. The recent success of the smelter is, on the other hand, to be ascribed to the growing extent of his market, while his processes are improved, and his means of credit (except as far as he pays wages) are not altered. But wages forming the very essence of the miners' outlay, he now finds his position changed for the worse. This, if he candidly examines, he will see the smelter has no share in causing. It is to be traced almost entirely to the working of the Bank Charter Act. Nor have we by any means felt the full extent of the working of this legislative Act. Circumstances have for the last three years deprived the continent of the power of vigorously competing with us.

The abandonment of numerous railway enterprises has temporarily relieved the overloaded labour market; the influx of destitute Irish workmen, and general depression of trade, have all had their influence in concealing the pressure which rests upon the first stage of our productive industry; but when the expected improvement comes, which cannot be delayed if tranquillity continues in these realms, and men's minds are directed to legitimate sources of earning, we may rest assured, that without some relaxation of the present restrictions, the mining interest will be hard pressed. As the whole is a calculation of employment of capital, it is easy to conceive how slight a balance of profit will divert investments from our soil into ships and foreign adventure, and how easy it will be to furnish the smelting-works with ore from other hemispheres, which might and ought to be raised from our own soil. Nothing is now more certain than that coals are most extensively spread over every portion of the globe; steam power is, consequently, with the aid of capital, now generally accessible as water power.

The means in the power of capitalists and workmen, by the aid of which they may partially avert the threatened evil, until the force of public opinion consigns the Bank Charter Act to the oblivion in which the corn, and other old unwise laws, have fallen, consist mainly in seeking to confer the benefits of credit on the poor, who have hitherto not enjoyed them. We do not see why small cheques, drawn on banks that would condescend to cash them as low as 15s., or even 10s., should not be used in payment of wages, and why the workmen of every district should not, as the Scotch have already done, with such immense advantage to their industry, invest their savings in shares in such banks. The Savings Bank system has become too formidable for the repose of the minister, and for the safety of the country. It is not wise, in our present circumstances, to have 30,000,000, standing "at call" against the Bank and the Exchequer. By teaching our workmen the advantages resulting from a judicious use of credit, far more benefit would accrue to the community than can result from attempts to outwit the experience, or to control the folly, of bank directors and speculators.

### COLONISATION OF IRELAND.

Ever anxious for the adoption of measures which may tend to the amelioration of the condition of the poor and neglected population of this might-be-prolific but ill-treated island, we hail with true gratification any suggestion for its relief and improvement, and we have, with much pleasure, perused a pamphlet containing *Three Suggestions for the Colonisation of Ireland*, by Mr. William Bridges. The author first quotes Sir Charles Trevelyan to the effect, that Ireland presents an extensive and varied field for the investment of capital and the production of wealth, on which her whole population might be employed, with great advantage to all the parties concerned; and Dr. Kane, who says "that the want of capital has been the bug-bear of Irish enterprise for many years. England has capital; Ireland has not—therefore, England is rich and industrious—Ireland poor and idle. But where was the capital when England began to grow rich? It was the industry that made the capital, not the capital the industry. An idle or ignorant man will lose his capital, where an active and intelligent man will create one. We leave out here, however, our mines unwrought—our powers of motion unapplied, waiting for English capital. Labour is capital; intelligence is capital; combine them, and you more than double your amount of capital. With such capital England commenced as Ireland must commence; and once begun, and in earnest, there will be no lack of money capital at our disposal." It is stated, on good authority, that Mr. Stuart French, of Monaghan, had reclaimed 300 acres of mountain land in four years, and raised its value from 2s. to 35s. an acre, and the entire cost was repaid by the crops in three years. Mr. Reade, of Wood Park, Galway, reclaimed 500 acres of moor land and mountain; the cost was repaid by the crop of the second year, and the land formerly worth 2s. 6d. has since paid 20s. per acre, and there are 124,000 acres of such land in Galway. In the county of Cork Mr. Conlithre reclaimed a bog farm, for which the tenants could not pay 4s. per acre, now rated at the value of 4l. per acre. Sir Charles Sligh, Bart., located the super population of his estate in Donegal on the waste lands, and assisted the poor farmers to cultivate them. He gave up his rents for two years, and employment has been found for six times the number the land could formerly support, and its produce has been multiplied manifold. Other instances can be given from numerous writers on the state of affairs of Ireland.

With these proofs before him of what can be done by perseverance, Mr. Bridges proceeds to consider what field there is open for general agricultural improvement. The detailed estimate annexed to the report of Lord Devon's commission shows nearly a million and a half of acres reclaimable for the spade or plough, some with the promise of great fertility, and two millions and a half more reclaimable for pasture, the greater part being in convenient proximity to the principal masses of destitute population; one entire half of the present population of Ireland is yet unprovided for by a state of nature. Little capital is required for the improvement of these wastes; organisation, rather, is the one thing needful; let the colonists be allowed to retain possession of the spots reclaimed by them, let them receive perpetual leases of their respective allotments, and all previously necessary would be that the tracts of land should be prepared for their labours by drainage, and being intersected with roads. The interest on the sums so expended, and of compensation for existing rights to the waste lands to be charged on it, when reclaimed, as a perpetual quit rent, redeemable at a moderate number of years' purchase. The state would thus incur no loss, while the advances would give that immediate employment to the surplus labour of Ireland which, if not given in this manner, will assuredly have to be given in some other, less useful and less likely to pay the cost.

Mr. Bridges now proceeds to the consideration of the issue of land scrip, by at once establishing a national mortgage, which would be merely nominal, of the land and property of Ireland to (say) 50,000,000, sterling, to be issued in land scrip, under the hand and seal of the Lord Lieutenant, in a form similar to that by the American States, who have established the same for the colonisation of their vast territories, and who only has the state never been called on to pay the interest, or any deficiency of it, but the companies and the Government have realised a considerable profit, while the country has secured a vast national benefit.

This land scrip is proposed to be advanced to capitalists, landlords, and public companies—such as the Irish Waste Land Improvement Society, Lough Corrib Commission, Mining Company of Ireland, the Irish Amelioration Society, and one or two honest Irish railway companies, if such can be found—an equal amount of capital in each case to be subscribed by the parties. These sums to be expended in the adaptation of waste land to productive settlement, in the completion of absolutely necessary railway communication, improvement of land already under imperfect tillage, the construction of cheap cottages, the encouragement and improvement of the fisheries, formation of harbours, and other useful and remunerative purposes. The closing portion of the pamphlet is upon the subject of the state of title in Ireland, and showing that the main requirements which must antecedently any great physical or moral improvement of the country, are certainty and security of title, facilities for the sale and transfer of land, and for the examination of titles, and the establishment of a free trade in land, for which a few simple and obvious principles of Legislature should at once be recognised. The principles enumerated for the advancement of Ireland, are similar to those which we have already advocated; and Mr. Bridges concludes with the following trite and pithy observation:—"Ireland must, at all events, now begin to be governed; and, perhaps, the first step in the right direction would be to invest Lord Clarendon with dictatorial powers within the limits of a defined principle of action. Ireland must either be governed, or put out of the way; for it is no longer a safe shuttlecock, to be for ever tossed about between the battledores of charity and coercion."

Industry, economy, and prudence are the sure forerunners of success. They create that admirable combination of powers in one, which always conduce to eventual prosperity. Guided by these handmaids to happiness, and sustained by perseverance, no position is too high to attain, no object too far for a man's reach, and no difficulties exist that cannot be overcome.

HOLLOWAY'S PILLS, A SUPERIOR REMEDY FOR SEVERE COUGHS, RECENT COLDS, OR AFFECTIONS OF THE CHEST AND LUNGS.—This far-famed medicine is the most extraordinary remedy ever known for the cure of recent colds, asthma, and all affections of the chest, to which fact many sufferers have testified. Its peculiar properties are such as to give immediate relief to the patient, and eventually effect a perfect cure. It speedily relieves the accumulated phlegm, thereby giving freedom to the respiratory organs; so let the asthmatic, or those suffering from tightness of breath, diseases of the lungs, or similar complaints, have recourse to these inestimable pills to ensure a permanent restoration to health.—Sold by all druggists, and at Professor Holloway's establishment, 244, Strand, London.

### RAILWAY TAXATION.

That the establishment of the railway system of transit has been of incalculable benefit to society, is, we believe, almost universally admitted, and that its promoters and supporters have not reaped anything like the golden harvest which their sanguine expectations and exaggerated calculations led them to expect, is equally evident. The enormous expenses inevitable in the locomotive system, not only in first cost, but in wear and tear, and keeping up the repairs of the permanent way, bear in themselves a large proportion to the returns; while the system of taxation lately adopted towards this species of property adds another enormous item to their already overburdened outlay. We have received a pamphlet on this important subject, from the pen of S. Laing, Esq., chairman of the London, Brighton, and South Coast Railway Company, and formerly secretary of the railway department of the Board of Trade, in which the hardships and injustice to railway proprietors, by the present mode of taxation, is ably illustrated. The railway company, of which Mr. Laing is chairman, paid in the past year 39,208l. in direct taxes—namely: passenger duty, 5 per cent., 16,375l.; rates and taxes, 22,833l.—in addition to the general income tax, and to the stamp, probate, and legacy duties paid on all transfers of their property, which are particularly onerous, both from the extreme inequality of the scale of duties upon small amounts, and from the circumstance that railway property is taxed on the scale of real property, in case of transfer by sale, while it is subject to the same legacy duty as other personal property in case of transmission by death. The results of this taxation are as follows:—A capital of 7,000,000l. has been expended in constructing 162 miles of railway through the counties of Surrey and Sussex, which commercial enterprise has yet afforded nothing like a return commensurate to the public advantages obtained. The net earnings for 1848, after paying working expenses and interest on borrowed money, were 210,600l., paying a dividend of only 34 per cent. on the ordinary stock. This stock, upon which 4,615,000l. has been paid, is, at present prices, worth only 3,220,000l.—showing a depreciation of 1,395,000l. Of this depreciation 800,000l. is due to special taxation, as, if they could have divided the 40,000l. thus paid, it would have made the dividend 4l. 8s. 6d., instead of 3l. 10d., and, consequently, increased the market value by 800,000l.; and the accounts of other companies show similar results, varying according to local circumstances. As a general rule, Mr. Laing states that railway property throughout the kingdom pays local rates alone on an assessed rental of about 30 per cent. of the gross annual receipts, or on about 3,000,000l. a year. Taking these rates to average 2s. in 1l., which, he says, is certainly below the mark, the amount of rates paid annually by railway proprietors will be about 300,000l., depreciating their property by not less than 6,000,000l.

The injustice of the present system of local taxation is most galling to proprietors in railways, on finding themselves compelled to contribute large sums for the benefit of a few parishes which have themselves profited largely by the construction of railways, and, in many instances, for the benefit of the very parties who have already extracted sums no less enormous for fancied injury. In the case of the London and North-Western Railway, the land occupied by it, in the counties of Middlesex, Hertford, Bucks, Northampton, Warwick, and Worcester, was previously assessed at an annual value of 2445l., contributing the 150th part of the total rates of the parishes in which it was situated. The same land, appropriated to the purposes of the railway, was assessed at 128,007l., and paid one-third of the total rates of the parishes. The Brighton Railway, which occupies 46 agricultural parishes, between London and Brighton, the united acreage of which is 86,508 acres. Of this the railway occupies 693 acres, which it pays rates of about 10,000l. a year, or 14l. per acre per annum, being one-third of the entire rates. In one case—that of the parish of Coulston—they occupy 53 acres of poor land out of 4200 acres in the parish, for which they pay three-fourths of the entire rates.

The injustice in these cases is, we think, apparent; and while there cannot be a doubt that railway, like all other landed and house property, should bear its fair proportion of the local burdens, we cannot see any reason or justice, because these companies are bodies who have invested enormous capitals, in expecting them to disburse the greater part of these imposts, and thus leave the wealthy individual landowner to pocket what ought to be his fair share of the expense. Mr. Laing then cites the results of various suits at law, and fairly discusses the anomalies that exist in the present system of rating railways, not the least of which is, that while a fair trial before an impartial tribunal, with appeal to a superior court, is provided for every petty action involving a sum of 20l., questions of first principles in railway rating are wholly left to the decision of the magistrates at quarter sessions. An amusing instance of the effects of rating railways is mentioned. Two adjoining parishes in Herts were formerly rated at 9s. in 1l.; one of them was fortunate enough to have a little angle of its land intersected by the London and Birmingham Railway, while the other is tantalised by the sight of it running, for some distance, within 100 yards of its boundary, without actually touching it. The consequence is, that in the lucky parish of North Church, they have got their rates down, at the expense of the railway, to 1s. 6d. in 1l., while their less fortunate neighbours of Wigginton are still rated at 7s.

Mr. Laing shows that, as the law stands at present, a railway company whose annual receipts are 200,000l., and expenses 100,000l., with a working stock of 200,000l., would be rated on a rental of 50,000l. a year; and if, by good management, it reduces its expenses to 75,000l., and raises its receipts to 225,000l., it would be assessed at 100,000l.; or, in other words, it will have to pay rates on every penny of additional income which has been earned by substituting frugality for extravagance, and good for bad management. He concludes by stating that the railway interest are ready to bear their common share of taxation for objects of general utility; and, if it should please Parliament to make the support of the poor a national instead of a local burden, and to charge its upon income instead of upon land, they would cheerfully acquiesce. But, until this be done, they will continue to appeal respectfully, but firmly, to the Legislature to relieve an interest which has done so much for the public from the anomaly of having to pay local rates where they have no local interest, and rates assessed upon income, while the principle of English law is assessment on land.

STENSON'S IMPROVEMENTS IN STEAM-ENGINES.—Mr. Stenson, whose patented emission rotary engine we described in the *Mining Journal* of Feb. 17, has, in his specification, a number of claims for various general improvements in the steam-engine, among which is a self-acting damper for high-pressure boilers. It consists of a vertical cylinder of an area of 1 square inch, fixed to the top of the boiler, and on it, with its base upwards, is attached a conical frame; the cylinder has a piston open to the action of steam from the boiler, the rod of which passes through a collar in the conical frame. The piston-rod is loaded with weights, equal to any number of pounds pressure per inch which may be required, and which are to be a counterpoise to the damper, to which the rod is connected by a chain and pulleys. A series of weights are slid freely on the piston-rod in the conical frame, increasing progressively in size from the bottom upwards, each supported by curved stays, projecting from the inside of the frame, by which they are kept about 2 inches apart from each other, and prevented pressing against the piston-rod. When the pressure of the steam in the boiler exceeds that to which the piston-rod is weighted, the piston ascends, and by the action of a collar on the rod below the lowest weight, raises it more or less towards the second one, which is supposed to be equal to 5 lbs. per inch pressure. On the pressure exceeding another 5 lbs., the first and second weights are more or less raised up towards the third, and so on to the top, the damper being lowered as the weights ascend, thus slackening the fire, and the pressure of the steam being reduced, the piston again descends, and the equilibrium is restored.—*Feed Water and Condensation*. A claim is also made for a plan for heating the feed water in condensing engines previous to its admission to the boiler. The cold water from the feed pump is forced through a coil of pipes, placed inside the enlarged portion of the exhaust pipe, and becomes considerably heated by the surrounding steam, before passing out towards the boiler. An arrangement, the converse of this, is also described, whereby the condensation of the waste steam is accelerated, and the quantity of injection water required greatly reduced. An air-chamber is placed in any convenient situation leading to the ash-pit, through which a strong current of air is constantly flowing inwards from the external atmosphere. The exhaust pipe is conducted into this chamber, where it discharges itself into a receiver, which is connected with a series of vertical pipes with a second receiver, from which a pipe leads to the condenser. The current of cold air which is constantly passing between the pipes, cools and condenses the steam within. There is also a plan for strengthening the steam pipes in tubular boilers by fixing tension bolts in them, and fastened through the end plates by screw nuts, or by placing the bolts outside, and having them screwed up to projections formed at each end of the tubes.



**EMIGRATION FACILITATED.**—Those persons who expect their friends in AUSTRALIA to assist them in their outfit, might write to their friends there to pay the money into the hands of S. W. SILVER & CO.'S AGENTS in AUSTRALIA, or to their connections in the district, who would be named on application to S. W. SILVER & CO., in London. The agent's acknowledgment would be received by S. W. SILVER & CO., as CASH at the exchange of the day, for the outfit. This proposal will be also communicated through the COLONIAL JOURNALS. EMIGRANTS fitting-out warehouse at No. 4, Bishopsgate-street (opposite the London Tavern), where colonial information may be obtained, and small parcels received and forwarded to the colonies.

**N.B.—CADETS TO INDIA, AND CABIN PASSENGERS** generally to all parts of the globe (with experienced Female Managers in the Department for Ladies), fitted out as heretofore at 66 & 67, Cornhill, by S. W. SILVER & CO., OUTFITTERS, CLOTHIERS FOR HOME USE, and CONTRACTORS; and at St. George's-crescent, LIVERPOOL.

## DAMP AND GASEOUS EXHALATIONS. SANITARY MEASURES.

ALL MEMBERS OF BOARDS OF HEALTH are especially directed to the most EFFECTIVE MEANS which they can ADOPT TO PREVENT the injurious and often FATAL EFFECTS upon the HEALTH of the COMMUNITY, arising from exhalations that are produced from moisture, decayed animal matter (as in grave-yards), stagnant water, and collections of fetid refuse, tending to produce a miasmatic state of atmosphere. In situations so effected, the impervious quality of the ASPHALTE of SEYSSSEL renders it the most perfect PAVEMENT or COVERING that can be relied upon for hermetically closing, and thereby preventing the rising of moisture and escape of noxious vapours. The present extensive application of this material for covering roofs, terraces, and arches, for preventing the percolation of wet, is strong evidence of its effectiveness for the above purposes, which is further confirmed by the following extract from the Report of the Commissioners on the Fine Arts:—

"In 1839, I superintended the construction of a house of three stories on the d'Enghein. The foundation of the building is constantly in water, about 19½ inches below the level of the ground floor. The entire horizontal surface of the external and internal walls was covered at the level of the internal ground floor with a layer of SEYSSSEL ASPHALTE, less than half an inch thick, over which coarse sand was spread.

Since the above date, no trace of damp has shown itself round the walls of the lower story, which are for the most part painted in oil, of a grey stone colour. It is well known that the least moisture produces round spots, darker or lighter, on walls so painted. Yet the pavement of the floor, resting on the soil itself, is only about 2½ in. above the external surface of the soil, and only 19½ in. at the utmost, above that of the sheet of water.

The layer of Asphalt having been broken and removed, for the purpose of inserting the sills of two doors, spots indicating the presence of damp have been since remarked at the base of the door-posts."

\* This method has been adopted at the new Houses of Parliament.

Seyssel Asphalt Company, Stangate, London. I. FARRELL, Secretary.

## IMPORTANT TO MINE OWNERS, &c.

### GUTTA PERCHA COMPANY—PATENTEES, CITY-ROAD, LONDON.

The GUTTA PERCHA COMPANY beg to bring under the notice of Mine Owners, Manufacturers, &c., the GREAT SAVING, both of time and expense, which is effected by the use of the GUTTA PERCHA PUMP BUCKETS and VALVES. These Buckets may be had of any size or thickness, without any seam or raised joint. They are unaffected by acids, alkalis, &c. Cold water will never soften them, and they are, consequently, much more durable than leather, and also cheaper. The most gratifying testimonials have been received from millowners, who have had these Buckets in operation for several months past, without the slightest repairs being required.

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### MEETINGS DURING THE ENSUING WEEK.

TUESDAY	Royal Botanic—Inner Circle, Regent's Park	3½ P.M.
MONDAY	Geographical—8, Waterloo-place	8¼ P.M.
	Medical—Bolt-court, Fleet-street	8 P.M.
TUESDAY	Medical and Chirurgical—53, Berners-street	8½ P.M.
	Civil Engineers—25, Great George-street	9 P.M.
	Zoological—11, Hanover-square	9 P.M.
WEDNESDAY	Syrio-Egyptian—71, Mortimer-street, Cavendish-square	7½ P.M.
	Society of Arts—Adelphi	8 P.M.
	London Institution—Finsbury-circus	7 P.M.
	Graphic—Tatched House Tavern	8 P.M.
	Pharmaceutical—17, Bloomsbury-square	9 P.M.
THURSDAY	Literary Fund—73, Great Russell-street	3 P.M.
	Royal—Somerset-house	8½ P.M.
FRIDAY	Antiquaries—Somerset-house	8 P.M.
	Royal Institution—Albemarle-street	8½ P.M.
SATURDAY	Asiatic—5, New Burlington-street	2 P.M.
	Westminster Medical—17, Saville-row	8 P.M.

### ROYAL INSTITUTION.

Prof. Grove read a paper "On Voltaic Ignition." The lecturer introduced his subject by asserting that the only philosophical idea of heat was that which regards it as a repulsive power—that, with the single exception of water, and other bodies which assumed a crystalline form when about to freeze (a condition which he ascribed to a polar state when these substances then took), all matter expanded by heat. Mr. Grove here referred to the experiments of Fresnel and Saigy on discs in vacuo, and the still more recent researches of Prof. Baden Powell on Newton's rings, as showing the repulsive effect of heat, measured by tints of light. This expansion of matter, so caused, can be communicated to neighbouring bodies. In the case of heat produced by intense chemical action, the effect was ascribed to the physical force of a species of molecular friction on the particles acted on. This chemical force is capable of transfer by the voltaic battery, and the calorific force moves with it. It was proved by an experiment on a compound wire of silver and platinum, that in proportion to the increase of conducting power, ignition was diminished. Mr. Grove here referred to recent researches of his own, to prove that this calorific action was affected by external causes. The same current was sent through two coils of fine platinum wire, one of which was surrounded by an atmosphere of air, the other by an atmosphere of hydrogen, when it was found that the wire in air became white-hot, while that in hydrogen was not heated. This phenomenon Mr. Grove ascribed either to the mobility of the particles of the hydrogen, or to the vibrations moving away from the vibrating surface, or to the state of the surface itself, hydrogen being, as to radiating power, to air what the colour black is to white. That this cooling effect does not depend on rarefaction, is proved by the intense heat and light produced by the current in vacuo. Mr. Grove then proceeded to show how the chemical force in the battery acted on masses of matter interposed in the circuit. He exhibited, first, the attraction of gold-leaf terminals, and then explained how liquid masses similarly attracted each other, and noticed a remarkable experiment lately performed by him with M. Cassiot's large battery of 500 cells (Grove's battery): of the two platinum poles, the positive was placed under water, the negative held over it, when a cone of flame issued from the surface of the water towards the negative pole, on the extremity of which a small globe was formed, which fell off as soon as the current was suspended. These facts may serve to explain more clearly the phenomena of the voltaic arc. Mr. Grove then exhibited paper on which the strong disruptive effect of the electric battery had dispersed metallic wires, and he showed that these explosions had always occurred in a line transverse to that of the current. He inferred that when ignition commenced in the wire its molecules assumed a transverse polar direction. He stated that when platinum is ignited by the current under circumstances which admit of the effects being accurately noticed, it contracts, swells, and breaks, and that a lead wire, similarly acted on, becomes divided by a series of transverse facets. In conclusion, Mr. Grove adverted to recent endeavours to obtain voltaic light for practical purposes. After noticing that no greater power of producing light had been obtained since the invention of his nitric acid battery, nine years ago, Mr. Grove stated that recent calculations had led him to believe that for some purposes, such as the illumination of light-houses, especially where an intermittent light was wanted, and of the interior of large buildings, it might possibly be adopted at no very remote period. He mentioned that the light of 1440 candles might be obtained at about 4s. per hour, but this concentrated light was not applicable for streets. The whole subject, however, was beset by many mechanical difficulties.

### INSTITUTION OF CIVIL ENGINEERS.

MARCH 6.—JOSHUA FIELD, Esq. (President), in the chair.

The discussion on Mr. Braidwood's paper, "On Fireproof Buildings," was renewed, and extended to such a length as to preclude the reading of any paper. It was urged that the intention of Mr. Fairbairn's paper, and that of Mr. Braidwood, had been somewhat misunderstood; the former had for object the description of defects in the construction of fireproof buildings for supporting heavy weights of machinery, &c.; and the latter, leaving untouched the question of construction, viewed the effects of fire upon metal beams in fireproof buildings. These were widely different questions.

The consideration of what was the actual loss of strength of cast-iron, under different degrees of elevation of temperature, was of vital importance. It appeared, from the evidence of Fairbairn's and Hodgkinson's experiments, that there was very little difference of strength between iron at a temperature below the freezing point and when raised to nearly 600° Fahrenheit. When, however, cast-iron columns and beams were practically subjected to the draught, or current of air, of a tremendous fire, in an extensive warehouse filled with combustible goods, and at the same time receiving large quantities of water from the engines, they must fall, either by melting or crushing.

It appeared that all the means of arresting fires generally failed when there was a large area on fire, and that the only effective means of prevention would be to have smaller and detached warehouses, or separating walls within the larger storehouses; but, inasmuch as this was a very expensive mode of building, and the land where warehouses were required was very costly, it became entirely a mercantile question, whether it was better to lay out a large capital in making a building perfectly fireproof, and providing such means as were in use in a mill, at Oldham, for deluging the rooms on an alarm of fire, or pay an insurance and incur a certain amount of risk. That the risk of fire in dwelling-houses was not very great, appeared to be admitted by the small rate of insurance demanded—generally from 1s. 6d. to 2s. per cent., upon which the Government charged 3s. additional for stamps—certainly the lion's share—without bearing any of the risk.

It was shown that the system of constructing mills containing machinery, with iron beams and brick arches, was as much for the purpose of avoiding the tremendous movement imparted by wooden beams and floors as for avoiding the risk of fire; for such were the precautions and care in the mills, that very few were destroyed by fire. It was suggested that bricks might be made expressly of the proper form to surround the slight iron columns used in buildings, and thus completely protect them from any injury from fire.

Phillips's system of extinguishing fires, by means of carbonic acid and steam, was mentioned; and it appeared that it was excellent for isolated houses in the country; for use in the hold of a ship, or inside any room; to arrest a fire at the commencement, without injury to the furniture, &c.; but that it could not be rendered so useful as water in preventing the extension of fires to the adjoining buildings.

This interesting discussion was interrupted by the monthly ballot, when the following candidates were elected:—G. Meredith, A. H. Bampton, W. P. Struvé, T. C. Watson, W. Scamp, H. Mandalay, J. W. Leather, and I. Coope, as members; Lieut.-Col. J. A. Lloyd, R.E., Captain Sir E. Belcher, R.N., C. B. Lane, H. G. Robinson, T. Gibbins, G. A. Biddell, J. N. Warren, C. P. Roney, C. L. A. De Buzge, E. B. Wilson, H. Robinson, S. D. Martin, W. T. Doyno, W. Swann, H. Vignoles, W. B. Lambert, and R. A. Stickney, as associates.

The paper announced to be read at the meeting of Tuesday, March 13, was "The description of the Camden Station of the London and North-Western Railway," by Mr. R. B. Dockray, M. Inst. C.E.

### ELECTRICITY AND MAGNETISM.

At the Western Literary and Scientific Institution, Leicester-square, on Wednesday evening last, Mr. WILKINS, of the General Telegraph Company, delivered a lecture on the electric telegraph, magnetism, galvanism, &c. It was the second of a course of three, the first of which was given on Wednesday week last, and the third will take place next Wednesday, March 14th. In the first, the lecturer described the nature of electricity, and the original discoveries of its powers; the addition made to the science by Gray, Dufay, and Franklin; lightning, and its identity with artificial electricity. In the lecture under notice, Mr. Wilkins observed that electricity was not confined to metals; it pervaded nature, and he believed that vegetation owed its existence to the powers and properties of this subtle element. Galvanism was the term for electricity produced by chemical action; it was discovered by Galvani, while dissecting a frog on a metallic plate; he pursued his researches, and for a time considered he had discovered the principles of life; it was, however, soon found to be an electric current, produced by the chemical action of two metals, and depended on the oxidation of one of them. Mr. Wilkins then described the galvanic circuit, the deflection of the magnetic needle, and the different degrees in the intensity of the current as produced by water, a solution of chloride of sodium, and dilute sulphuric acid. Electricity was applied to telegraphic purposes as long since as 1746, and for 50 years afterwards electricity of high tension was employed, such as produced by the frictional machine. The discovery of Ersted, of the deflection of the needle by a current of galvanism, opened a new field of action, and the modern electric telegraph might be dated from 1820. Although Cooke and Wheatstone were the first patentees, Mr.

Alexander, of Edinburgh, constructed the first perfect instrument, which consisted of 26 wires, answering to the 26 letters of the alphabet; these were afterwards reduced, by successive inventions, to 8; then to 4, and even to 1 wire. The lecturer then described the action of the bell machinery, by converting a piece of soft iron into a magnet by a current of galvanic electricity; it attracts an armature, which disengages a detent from a toothed wheel, and setting the train of wheels in motion, raises the hammer and strikes the bell.

He then described the several improvements of Holmes, Highton, Whishaw, Henley, and others—all of which have lately appeared in our columns, with, we think, the exception of a magneto-electric battery of Mr. Henley. This instrument entirely supersedes the acid battery, and zinc and copper elements, which are so variable in their action, that no regularity can be depended on. It consists of a perpetual horse-shoe magnet, having between its poles a bar of soft iron, which, of course, is held there by magnetic attraction; around it is a coil of copper wire—the two ends of which, being attached to the telegraphic instrument, forms the circuit. By pressing a lever, this bar, which while *in situ* possesses in itself a proportional part of the power of the magnet, is suddenly torn away, and immediately gives out its magneto-electricity to the coil in sufficient force to deflect the needles to an equal extent with the galvanic current. Mr. Wilkins designated this as the most constant, and in connection with Mr. Whishaw's uniformity of time telegraph, the most simple and perfect arrangement he knew of. Holmes's air-whistle, a substitute for the bell machinery, was next described; and the rapid passage of electricity was illustrated by a beautiful experiment, which formed the basis of Mr. Wheatstone's calculations, that electricity travelled at the rate of 282,000 miles per second. A circular disc of wood, painted black, having on it eight white stripes radiating from the centre to the circumference, is connected by a pulley and band to a grooved wheel of considerably greater diameter than the pulley on the disc, which wheel, being sharply turned by a winch handle, the disc is put in such rapid motion that the white lines are no longer visible. The lights in the theatre were then darkened; and, on passing an electric spark from the frictional machine, the white lines are for an instant depicted on the retina of the eye, as if stationary—proving that rapid as is the motion of the disc, the passage of the spark was immeasurably more rapid, sufficiently so as to make the former appear stationary. Mr. Wilkins was listened to with interest; and his lecture gave much satisfaction to a respectable audience.

### PATENT CORK FIBRE—LIFE-PRESERVERS IN SHIPWRECKS.

About twelve months since we had our attention drawn to a patented plan, adopted by Messrs. Taylor, of Great Dover-street, Southwark, for stuffing the hammocks, bolsters, beds, seats, cushions, &c., on board ships with cork, cut into a fibre sufficiently small to be soft and elastic, and to answer the double purpose of the above-named useful appendages, and forming an infallible life-preserver in cases of shipwreck. Provided with any of the most ingenious inventions for the preservation of life at sea, a ship may be; but it generally happens that in the awful moment, when required, they are out of repair, or not to be got at, or, perhaps, not one-tenth part sufficient to save the whole on board; while each bed and bolster forming a life preserver, every passenger, every man of the crew, has the means of preserving his life, by bringing them on deck in the moment of danger. Shortly previous to the period mentioned above, numerous experiments took place at Woolwich Dockyard, the Serpentine, and various sea ports, before many naval authorities and the public, to test the preservative properties of alreduced cork, so as to adopt it to the double purpose required; and in every case these experiments were, we believe, most completely successful, and proved the facility and almost certainty of preserving the lives, and probably the valuable cargoes, under circumstances of storm and shipwreck. It was generally understood that Government had ordered one of the vessels to be fitted with this bedding, to proceed in search of Sir J. Franklin, and that several foreign Governments were also anxious to adopt it. In one or two communications, however, which we have since had with Messrs. Taylor, we have found that the delay in bringing the invention forward was occasioned by the difficulty experienced in getting the machinery perfect, and to operate with sufficient rapidity, as not to make the material, when prepared, of too costly a nature. We understand from the patentees, that these difficulties have been completely surmounted—that the fibre can now be produced in the most perfect state for the purposes required, and at a cost which will generally induce its substitution for other descriptions of bedding for sea. The floating property of cork rendering it so efficient as a preserver of life in case of shipwreck and fire at sea, is but one amongst its excellent properties by which it is adapted to many of our requirements. For cleanliness it is unsurpassed; it is a natural repellent of insect life, and is a non-conductor of heat, which properties render it generally a most superior material for mattresses for barracks, unions, hospitals, lunatic asylums, &c.; and for India it is invaluable—beds, stools, carriage linings, horse collars, and other similar materials in that country, all perish before the moths, ants, and other devastating vermin; while they shun cork, as possessing none of the oils, or nutritive matter, necessary for their support. Looking at the result of the various experiments, in the success which has attended the patentees in their persevering efforts to produce an unlimited quantity of the fibre by steam machinery, and the interest which, from recent lamentable accidents at sea, must be awakened in the public mind, we are led to believe, that among the numerous applications of science to the wants of man, which we have been called upon to notice for some years, this holds a place of first-rate importance.

**THE MINERALS OF GLENESEK.**—In a translation of a Latin description of Angushire, written in 1678 by Robert Edward, minister of Murroes, we find the following notice of these treasures:—"As to the metals contained in the bowels of this country, different kinds of them are to be found in the valley of North Esk. The great-grandfather of the present proprietor of Edzell discovered a mine of iron at the wood of Dalbog, and built a smelting-house for preparing the metal. This gentleman's grandson found some lead ore near Invermark, which he refined. The son of this latter found a very rich mine of lead on the banks of the Mark, about a mile up the valley from the Castle or Invermark. In a mountain of hard rock, where 18 miners are digging deeper every day, they have come to a large vein of ore, which, when the lead is extracted and properly refined, yields a 64th part of silver. This vein seems to be inexhaustible." The troubles of the Edzell family began shortly after that date, and these diggings had not likely been long prosecuted. They were, however, during last century, again attempted by an English company; but, in consequence of bad management, the profits were small, and the undertaking was abandoned.—Montrose Standard.

**POOR-RATE ON IRISH MINES.**—The rate-in-aid is now absorbing public attention, and, until it shall be disposed of, there can be little hope that any other changes in the Irish Poor-Law will excite the slightest interest. There is, however, one evil in the existing Poor-Law so pernicious in its effects, that the present opportunity of a general modification of the law should not be allowed to pass without securing a remedy. We allude to the palpable injustice of rating Irish mines on a totally different principle from those in England. In Cornwall, mines are valued for poor-rate like land, or any other property, according to the real and *bona fide* value; and the party owning the royalty is charged with his full proportion of the burthen. But in Ireland, by some unaccountable neglect or infatuation, the valuation of mining property is made by some random calculation of persons often utterly ignorant of such matters, who make a guess-work as to the supposed value, without regard to the expenses of working, the low price of the produce, or, consequently, to the amount likely to be realised as profit in the working of the mine. This result, accordingly, has been witnessed—that mining companies, which have been unable to realise any profit at all on the outlay of their capital, whilst affording extensive employment, but, on the contrary, have suffered a loss—have been compelled to pay a heavy poor-rate, because the valuers have set down their machinery and effects at a high figure in the rating-books. We must do the framers of the Irish Poor-Law Act the justice to say, they intended that the rate should be made upon the net annual value; and, if this principle had been carried out, there would be no taxation where there was a loss instead of a gain. But the absurd and most unjust mode of arranging the valuation, leaving it dependent upon the caprice of a person necessarily ignorant of such matters, has produced all the evil we have described, and the Irish Poor-Law Act disables the commissioners from affording redress. The remedy required by the Irish mining companies is simply an equalisation with the practice in England, which would be just to all parties concerned, whilst it would afford a legitimate stimulus to mining industry and enterprise in this country, which now stands so much in need, not only of fair play, but of every encouragement which the reformation of the law can supply.—Dublin Mercantile Advertiser.

**MARINE SMOKE-CONSUMING APPARATUS.**—The Admiralty have countermanded their order for the removal of Mr. Haig's smoke-consuming apparatus from the machinery of the *Arcturion*, old steam-vessel, at Woolwich; so we presume the experiments which have been going on for the last two years are to be continued.—United Service Gazette.

**THE DEVIL'S DYKE.**—A correspondent of the *Sussex Advertiser* states that he has scientifically ascertained the height of the Dyke-hill to be 685 feet 3 inches above the level of the sea. It has often been asserted that it was 1000 feet above the sea.

**ROYAL SOCIETY.**—The Earl of Rosse, as President of the Royal Society, has issued cards for soirees on the four Saturdays, April 21, May 5, May 26, and June 16. The soirees of the new President will be given in an extensive suite of rooms in Somerset House, placed at the disposal of the Royal Society, for the purpose.

**EXTRAORDINARY INVESTMENT.**—The following speculative lot was put up to auction, at Mr. Marsh's sale, on the 1st inst:—"The important and valuable reversion in and to a moiety of 12,000l. Consols, receivable on the decease of a lady, now aged 67, provided she shall have no more children; the youngest child is 19 years of age, the husband is still living, and is now aged 69 years." The lot sold for 2180l.



## Original Correspondence.

## IMPROVEMENTS IN ELECTRIC TELEGRAPHS.

SIR,—I beg the favour of space in your columns, to make a few remarks on the communications of Mr. Holmes and "G. E. D." in your Journal of the 3d inst., animadverting on a letter of mine in a previous Number on the above subject.

Mr. Holmes states that "the several plans proposed are already in extensive operation, and have been so in some instances for many years;" but I think I can make it appear that this applies to only one of them, both as to the extent and period of employment. The suggestions made and points touched upon are as follows:—

1. To cover all telegraphic wires with gutta percha, and secure them to the posts with the same substance.
2. To fix one or two lightning conductors to each post.
3. To remark that nothing but the means is wanting to lay the telegraphic wires between this country and France.
4. To coil submarine wires round a 2-in. rope, keeping them 1 in. apart, and covering the arrangement with canvas pitched on the outside.
5. To effect an electric communication between America and Europe; and, for this purpose, to support wires partially with corks, so as to relieve them of the strain of their own weight.
6. The use of pairs of needles.
7. The covering of the wires of the telegraph with gutta percha is yet adopted to a very limited extent, and only under peculiar circumstances. Mr. Holmes himself says, "Several miles of wire are now in use upon this plan in tunnels and underground throughout the kingdom." Several miles throughout the kingdom, and that very recently, is different from "extensive operation" for many years. But it was the employment of gutta percha on all wires that I suggested, and not merely on those in tunnels. This, and securing the wires to the posts with gutta percha, "G. E. D." admits would "render the insulation very perfect."

2. Relative to lightning conductors, Mr. Holmes states that they "are at present affixed to every post on a line of telegraph placed upon the opposite side of the post to that supporting the wires." This cannot be reconciled with what I was told by a gentleman belonging to the Electric Telegraph Company when I communicated the suggestion to them some time since—namely, "We restrict the use of these conductors to the stations where they can be conveniently watched and adjusted;" and, by the directors of the same company, "It does not appear to them that it will be practicable to employ conductors in this way." To ascertain the truth as far as the South-Western line is concerned which I cross every day five or six times, I have just walked for some distance along it, and see nothing of conductors; neither have I seen them on any line on which I have travelled, except, occasionally at the stations. It would, however, seem from what your correspondents say, that the plan has been tried, but it would appear in a very incomplete manner; for who that knows anything of the behaviour of the electric fluid, would suppose for a moment that conductors, carried only 6 inches above the posts at the great distance the latter are apart, could protect the wires? Such short conductors would rather tend to an opposite effect.

3. Mr. Holmes says, the delay and difficulty in laying the telegraphic wire between England and France "does not exist in laying down the wire, or in maintaining a perfect circuit, as far as insulation is concerned." In this we accord—"But one exists (he adds) in the difficulty of securing an uninterrupted and unbroken circuit;" then, supposing an accident, jumps to the conclusion that "the broken and half-buried wire" must be abandoned and replaced by another; and says—"Here is the true difficulty—the sinking of money in the bed of the ocean." Thus we both arrive at the same point, that the money is the obstacle. I do not, however, agree with him in his hypotheses; for, in the first place, the wire may be damaged and not broken; next, a second wire in store will always be necessary as a reserve, and the communication can be restored by this in a few hours; again, there will not be the least occasion to abandon the old wire, which can be raised at leisure and repaired; and, again, by passing the wire in use at intervals of time over a roller projecting from the side of a steamer, its burial at the bottom can be prevented; whilst, by the same means, it can, as it ought to be, be occasionally inspected. Mr. Holmes then proceeds on a digression, surmising many things that we shall yet live to see, and attacking M. Le Moit; but as the present question is not what we shall live to see, but what we can now do, and I am not concerned with M. Le Moit's communications, I will not occupy your valuable space with any remarks upon it.

4. Neither of your correspondents touch in detail upon this point; but your readers must be aware that this has not been in "extensive operation" at all, and certainly not in the manner I suggested.

5. As to the telegraphic wires between Europe and America, this has most certainly not been in "extensive operation for many years." So far from it, I was the first in this country to propose such a thing; and about a week after I had done so, intelligence was received from America, that projects of the same kind had been brought before the United States Congress.

6. An astatic combination, I am aware, has been in general use for many years, and my remark on this point arose from having been led to suppose that for some unaccountable reason it had fallen into disuse on the line where the deflections to which I referred were observed. Having occupied so much of your space in replying to Mr. Holmes, I must be very brief with "G. E. D.'s" letter, and only refer to those points to which the previous remarks do not afford an answer. He objects to the gutta percha covering—first, because of the expense; secondly, he doubts "whether the advantage gained would be so great as I suppose." The financial part of the question I did not enter upon, the sole object of my suggestions being to produce a perfect telegraph; and "G. E. D." himself confesses that, on my plan, "the insulation would be rendered very perfect;" although he adds the following extraordinary qualification to its perfection in this respect—"if the expense of the covering were not a too serious objection." As to the advantages to be gained, Mr. Holmes is a witness—"The enormous cost of erection in telegraphic communication (he says) would be cheapened by the removal of all insulation on the line, and the necessity of straining and winding the wires likewise dispensed with." Thus there will be a set-off against the expense of the gutta percha. Another great advantage will be the prevention of discharges of pyrogon upon the wires during thunder-storms.

In conclusion, I must maintain, that if all the telegraphic wires are covered with gutta percha, and a sufficient number of lightning-conductors fixed at proper distances from each other, and carried to a sufficient height, and proper means of insulation be provided at the extremities of the wires, it will be quite impossible that snow, frost, rain, fog, or copious convective and disruptive discharges during a thunder-storm, will interrupt the communication, for the insulation will be "very perfect."

J. J. LAKE.  
Royal Laboratory, Gosport, March 8.

## THE ELECTRIC LIGHT.

SIR,—I am not aware whether Mr. Staitte will think himself bound at once to answer, among others, the attack of "E. L." contained in your last Number, or farther bide his time; but I, as one of the earliest promoters of the "electric light," cannot refrain from remarking in reply, that the public have been "gulled" no further by the assertions of Mr. Staitte—viz.: that he could, or would, do so and so, than in believing those assertions, which they were as free to reject or doubt. They have as yet had nothing to pay for any hitherto misplaced confidence—not a share has been issued, or one shilling received by the company from the public; therefore, the unworthy insinuation contained in the following remarks—viz.: "that the whole proceedings have been carried on from motives not of the most disinterested character, and for the purpose of inducing the public to subscribe for shares in the company," &c.—falls at once to the ground. Such remarks would induce the world to believe that Mr. Staitte, or those connected with him, had been quietly pocketing the cash, and gullying the public by the sale of a worthless article.

The exhibitions at the Hanover-square Rooms, Western Literary Institution, Cattle Show, Crosby Hall, Duke of York's Column, and National Gallery, which afforded some little astonishment and amazement even to the scientific portion of the public, are facetiously called "puppet shows" by your correspondent simply, I presume, because they were as free of cost to the spectators as the daily exhibitions of "Mr. Punch" in our streets. The parties most interested—viz.: those who have, and still continue, to provide the means for prosecuting this wonderful discovery to perfection, continue to entertain the most sanguine hopes of ultimate success. It is an affair of no ordinary importance, and may require still further time to complete; but it is progressing, and has never been at a complete standstill. When the goods are quite ready, and for sale, they will be offered to the public; in the mean time, the public will not be asked to part with even the half-a-crown per share deposit.

March 7.

W. C. E.

## STEAM LOCOMOTIVES ON COMMON ROADS.

SIR,—Seeing several communications in your Journal upon the above subject, and as there appears a disposition, particularly on the part of your correspondent, Mr. Motley, to doubt the statements made by "A Road Locomotive Engineer," in his remarks in the Mining Journal of the 13th January last, allow me to inform your readers, that a steam locomotive for plain roads was manufactured at these works, some time ago, with all the improvements commented upon by your correspondent, and claimed as the invention of Sir James Anderson in Mr. Clarke's report. The steamer, or fore carriage, particularly, was on the principle described—very powerful, and most easy to manage. The carriage ran many hundreds of miles for experiments, and was well known to the public at the time as the most complete, powerful, fast, and elegant in appearance, of any carriage of the kind previously constructed. Although I have no doubt of its being in existence, not having seen it for some years, I have no knowledge of its present condition.

JOHN GOLLIER.  
Wellington Foundry, Charles-street, City-road, March 8.

## VENTILATION OF COAL MINES.

SIR,—It must be gratifying to every one interested in coal mining, to learn that Mr. Gurney's high-pressure steam principle can be applied with such powerful efficacy in the ventilation of collieries; we need no further proof of its capabilities, than that Seaton Delaval, one of the largest collieries in the Newcastle district, has been for the last four months most abundantly ventilated by high-pressure steam; and with such evidence of its utility as that of Mr. Forster, the eminent viewer, who has the management of the colliery, we can no longer doubt that the application of jets of steam is decidedly superior to any other mode of ventilating collieries yet discovered.

In a letter, which appeared in your valuable paper in December last, Mr. Forster says—"The quantity of air circulating through the mine, previous to Gurney's steam apparatus being erected, was 58,058 cubic feet per minute; and since it was set to work the quantity has been 79,859 cubic feet per minute, which is an increase of nearly 50 per cent."

The apparatus at present is only applied at one of the upcast shafts; and I am pretty confident, if another were erected at the other upcast, a corresponding increase would be the result.

To Mr. Gurney it must be pleasing to see that his labours have not been in vain, and that he has conferred a boon on both coalmaster and collier, for which great praise is due, more particularly as that gentleman has no pecuniary interest in his invention; and I must congratulate Mr. Forster in his having made the first successful trial on such an extensive scale, and hope he may succeed in its application in its other upcast shaft.

Your willingness at all times to lay your columns open to discussions on this important subject, prompts me to obtrude so far on your space, as to ask Mr. Gurney whether the steam jets would be more effectual at the bottom of a deep pit, or within a few yards of the surface? This question is of importance in cases where it may not be convenient to fix a steam-boiler underground.

Wigan, March 8.

KING COAL.

## VENTILATION OF MINES.

SIR,—The ventilation of mines being a subject which has lately been more than usually discussed, perhaps a few additional observations may not be uninteresting to those who wish to become acquainted with the different modes that have, from time to time, been used, as well as those new ones which are daily being brought before the public. The detailed arrangements of various coal mines, and the extent of the workings, dictate different methods of supplying the collier with fresh air, and of carrying off the noxious gases; but the principle on which all mines are ventilated, is the same—viz.: atmospheric air, by its specific gravity rushing in to fill a partial vacuum. The best method of forming this vacuum is the question. In mountainous districts many collieries are well ventilated by the exit for the air being at a greater height than the entrance to the mine, the heat from the candles and men being sufficient to cause a draught; in others worked by pits, a fire is placed at the bottom of one, called the upcast shaft, to rarefy the air, and thereby cause a draught; in others, a furnace having a high stack placed near the top of the upcast pit, causes the same effect. These methods are, doubtless, best, but frequently the effect produced is not sufficient, and it then becomes necessary to resort to other means, and steam, our grand resource, may always be brought to aid; but I very much doubt that it will prove as effectual, or economical, used in the manner suggested at the Polytechnic Institution, on the 28th ult., as if the steam were used to move an engine, to which should be attached a large fan, to produce the necessary vacuum. Most people know the effect of a common winnowing machine, turned only by a single person, and it will be easy to imagine the effect that may be produced, by increasing the size of the fan, and the power to drive it, to any extent that may be required. Many years ago I had occasion to ventilate a mine that had been for some time unworked, and although the air had to travel upwards of a mile, the effect produced by only one man turning a fan, exhausting the air at the upcast, was quite surprising. I do not suggest this method as anything new, but, as I have never seen it adopted elsewhere, I think it worth the attention of parties who have difficult mines to ventilate. I have also found a light portable fan, to the centre of which was attached a long canvas tube, stretched on hoops, and painted, to make it air-tight, occasionally very useful in conveying the impure air away from the face of workings, drifts, &c., to the main air-way, where it passed off with the general ventilation. I think it would be found, by a comparative experiment, that a much greater effect would be produced by a fan, in giving a current to a large volume of air, than by a simple jet of steam; this latter will, I am aware, produce a sharp intense draught, as is shown in locomotives, but it is quantity of air that is required for the ventilation of mines.—P. March 7.

## MINERS' PROVIDENT ASSOCIATION.

SIR,—Will you allow me, through the medium of your excellent paper, to call the attention of your readers to a letter, signed J. Richardson, C.E., of the 24th Feb., and to the great importance of the subject of that letter. Few persons, unacquainted with a miner's life, can imagine the enormous amount of misery caused, not only by mine accidents, but by other casualties that miners are subject to. It is a very well-known fact to those living in the neighbourhood of deep mines, that the loss of health from the impure air they continually breathe is terrible, and premature deaths are of common occurrence—indeed, I believe the average life of a miner in Cornwall is only 32 years, so that I am sure there is no class of men who have so great claims upon another, as the miner has upon those who get rich by his risk of life and toil of body; and this being the case, surely the lords, merchants, and rich adventurers cannot refuse their support towards establishing a provident association or assurance, not only to provide for their destitute widows and orphans, in case of their death by accident, but also for themselves, should any of the many dreadful accidents befall them short of death.—A. DIAMOND, Newton, near Tavistock, March 7.

[For continuation of "Original Correspondence," see page 120.]

## ACCIDENTS.

The late Colliery Explosion.—Her Majesty and His Royal Highness Prince Albert, and the Queen Dowager, have respectively contributed a donation of £50. to the fund for the relief of the widows and orphans and the families of the sufferers by the late explosion at Darley Main Colliery.

Another Fatal Colliery Explosion.—It is our painful duty to record another of these lamentable accidents, which took place on Tuesday morning last, a little before seven o'clock, at the "Middle Patrician" Colliery, the property of the Ince Hall Coal and Canal Company, situated half a mile between Wigan and Hindley. The usual number of hands, about 25, had descended about six o'clock, and, from the dress of some of them, it would appear they had not commenced working. There are two seams worked at this colliery—one 5 ft. thick, in which the accident took place, is 200 yards deep; and the other, 4 ft. thick, is 20 yards deeper—the two shafts being only 30 yards asunder, and each serving the purpose of working one seam only, but communicating as up and downcast shafts for the purpose of ventilation. The downcast shaft, however, only reaches the 4 ft. seam, and as soon as the men descend from the top of the shaft, the men, as soon as they heard, every effort was made to rescue the men, and the managers, with Mr. James Lancaster, one of the partners, descended the pit. Twelve or thirteen men and boys came up unhurt, and stated that in the part of the pit where they were at work no inconvenience even was felt. In a short time the other portions of the workings were examined, and by 11 o'clock eight bodies were taken out, with an old man, named J. Lewis, who lost three sons by the explosion, so dreadfully burned, that he died in an hour, and two others severely injured. About 12 o'clock two others were brought out, when a poor woman, named Pender, said her husband was also in the pit, and after searching for some hours his body was recovered—making in all 12 victims. The explosion occurred about 300 yards from the shaft, but how, and why, probably never be known. Ellison, the underlooker, and the furnaceman, had previously, as usual, examined and reported all safe—the latter having fixed up a fire-damp board in a distant part of the workings, past which none of the men ought to go, and it is supposed one of them had recklessly gone beyond this signal of danger with a candle, and caused the explosion. Those uninjured stated, that where they worked the air was strong and pure, and the mine, as far as they could judge, in good workable order.

The Boiler Explosion at Alton Bywater Colliery.—Among the accidents in last week's Journal, we noticed the explosion of the boiler at the above colliery, by which Ralph Brown, the engine man, was so injured that he died in two hours after the casualty. From the evidence adduced at the coroner's inquest on the body of Brown, it appeared that the boiler, which had only been in use seven weeks, was a new one, made by Joseph Shaw and Son, of Hunslet Iron Works, about a year before it was badly caulked, and was excessively leaky. The engine was of 16-horse power, high pressure, and worked at from 30 to 40 lbs. pressure per inch. The destruction is astonishing; the windows, doors, slated roofs of the cottages and buildings, are absolutely demolished; some of the walls thrown down; the ponderous iron work of the fly-wheel, and moving parts of the engine, torn in ribbands, as if they had been reeds; and the buildings left standing are covered with a filthy deposit from the action of the condensing steam. The boiler was separated, one half being driven 250 yards distance into an adjoining field; the other half was divided in two parts, and was ejected in the contrary direction. There was nothing among the ruins which could give to the jury the slightest clue to the cause of the accident; the boiler plates were of sufficient thickness, but it is probable the leakage had something to do with it; the verdict accordingly was—"Accidentally killed by the explosion of a steam-engine boiler, but by what means the same was caused doth not appear."

Roadway Regis.—Two fearful accidents happened at Hadon Hill Colliery, on Saturday and Sunday last. In the first, Jesse Raybould was dangerously cut and bruised about the head and upper portion of his body by a fall of coal; and in the latter case, William Woodcock was frightfully burned by an explosion of fire-damp, while in the pit by himself, where he remained, in the greatest agony, until 6 o'clock on Tuesday morning. Both lie in a precarious condition.

COAL-PIT EXPLOSIONS.—The recent coal-pit explosions in different parts of the kingdom, have led to the suggestion of the following means of prevention, by Dr. G. Dunn, of Doncaster:—"The explosions in question have been observed to occur during the prevalence of high winds, and this, no doubt, is attributable to the wind forming an eddy in the upcast as well as the downcast shaft. The eddy in the downcast shaft does not penetrate to the bottom of the mine, nor can the lighter and deleterious gases force through the eddy in the upcast shaft, and hence accumulations of hydrogen gas take place, which require but the naked light of the miner to cause an explosion. To obviate the evil it is only necessary to secure a constant current of air in every part of the mine, and to take care that the up-cast shaft shall be so guarded that no eddy can form in it. This can easily be done by placing a ventilator, in the form of a hood or cow, and self-acting, over the upcast shaft; and in order to insure a free and rapid current of air through the mine, a ventilator must be placed over the downcast shaft, with its open side or mouth to the wind, which also

can be made self-acting where a down-cast shaft can be appropriated to it, and by such means a current of pure air as rapid as that on the earth's surface, can be made to circulate through every part of a mine. This is no longer a speculative theory, but a matter of fact, as the trial of the ventilator (though under many disadvantages) at the Darley Main Colliery attests, and which was witnessed and tested not only by the inventor, but by the practical men belonging to the pit. The only drawback to the universal application of the self-acting ventilators appears to be where there is only one downcast shaft, and that the working one. A self-acting ventilator could not, of course, be placed over such a shaft, but this is seldom the case in mines of any magnitude. Even, however, in such cases the upcast shaft could have the advantage of one to prevent the eddy which, as before stated, impedes the escape of the lighter and deleterious gases, and a canvas one can be so contrived as to be used over the downcast shaft during the hours when the pit is still, or when high winds or other causes render the mine in the slightest degree dangerous." Dr. Dunn purposes dedicating his invention to the public, conceiving that where human life is so largely at stake, there ought to be no impediment thrown in the way by patent or other cost, and he is prepared at any time to submit models for inspection. He deems it an essential feature in any improvement in the ventilation of mines, that it should combine simplicity with efficiency, cheapness, and durability, independence of action, and a total absence of annoyance to coal-owners, coalworkers, and workpeople of every grade.—Times.

## RAILWAYS IN SOUTH AUSTRALIA.

The rapidity with which this fine colony has risen in a few years, and its greatly increasing agricultural and mineral wealth, render it desirable that the principle of railway transit should be introduced, at least in a few instances where the traffic, particularly in goods and minerals, more immediately requires it. The Burra Burra Mine alone paid for carriage, in 1847, 44,000*l.*, and there are, in the mining district, 30 mines now working, all the proprietors of which would immediately avail themselves of the more rapid mode of transit, should it be carried out.

A company has been already established for forming a line of railway from Adelaide to the port—a distance of seven miles; and a prospectus is about to be issued for the formation of another, for constructing a line from Adelaide to the mining district, through the northern division of the province. The first 50 miles are over a tenacious soil, on a level plain, requiring neither cutting or embankment, the remaining twenty miles is rather undulating, but without any engineering difficulties; and the completion of the whole has been estimated at 2000*l.* per mile. From careful calculations founded on the actual traffic now passing through the country, it is computed that the gross annual receipts cannot fall short of 75,000*l.*; and allowing 45 per cent. for management and general expenses, would leave a profit of above 20 per cent. on the capital expended, and the returns may reasonably be expected to increase as the wealth and population of the colony are multiplied, and which have been doubled within the last five years.

We cannot doubt that South Australia—not having the benefit of navigable rivers—would derive great advantages from the construction of the railway through the proposed district, which would facilitate the carriage of the ores to the shipping place, improve the value of the land along its route, and bring into rapid cultivation thousands of acres which would otherwise remain in a state of nature. The Government, both at home and in the colony, are highly favourable to the project; and an Act has been passed there to facilitate the construction of railways, and authorising the making free grants of land to railway companies. On the formation of the company for constructing the line from Adelaide to the port, the shares were immediately taken up, and an engineer shortly afterwards dispatched to the colony with all necessary materials to survey and commence the line; and we have no doubt the same success will follow the present company, whose line, passing through many townships, would ultimately receive a greatly increased revenue. The proposed capital is 200,000*l.*, in 10,000 shares of 20*l.* each; and it is suggested that a fund shall be established, out of each year's profits, for the construction of another 25 miles, in about 10 years from the present time, making in all 95 miles.

Mr. W. S. Chauncy, the engineer, in his report, states, that his observations are the result of four years personal knowledge of the country, and that he alone is responsible for the statements set forth. That the absence of navigable rivers renders the introduction of railways very desirable; that the present mode of carrying the ores by bullock drays is slow and expensive; and that as the number of cattle increase, artificial food, scarce in the colony, will have to be substituted for the natural pasture, which will materially add to the expense. The geological features of the country are just such as an engineer would desire; the substratum belonging to the primitive formations being firm and unyielding, and abundance of excellent ballast is easily obtainable throughout the line. The country abounds in lime, stone, timber, and other necessary materials; the bridges required will not exceed five, and the rivers being small, and the banks steep, they may be passed at a level with the natural surface of the plains. The present population of the colony is not less than 40,000, of whom 10,000 reside in Adelaide, and 20,000 in the districts through which the railway will pass. At present the inducement held out to the agriculturists for the cartage of ores, tends to draw them away from the cultivation of the soil, but railway communication would not only obviate this, but would give an impetus to agricultural operations. Many are now deterred from such pursuits from the expense attending the transmittal of their produce to market: when this obstacle no longer operates as a barrier, it may fairly be presumed that large districts will be brought under cultivation, which would otherwise remain in a state of nature. It is proposed to use transverse timber sleepers, on which should be placed longitudinal bearers, of such scantling and so formed, as to take the whole of the bearing or strain in England usually borne by the rails, when rails of 85 lbs. per yard would be sufficient, though heavier ones, if considered necessary, might be used.

## LITERARY NOTICES.

A Guide to South Australia, being a Descriptive Account of the Colony; addressed to intending Emigrants, and containing the latest Authentic Information. By W. SNELL CHAUNCEY, C.E. London: Simpkin, Marshall, and Co.; Rich, Batton-garden; and Saunders, Charing-cross.

To the emigrant, who is about to leave his native soil, and seek in a far distant land those necessities and comforts of life, which peculiar circumstances, depression in business, or a superabundance of population, deny him here, it is of great importance that, before he prepares to start, he should make himself well acquainted with every fact connected with the colony of his choice, its capabilities, climate, produce, soil, inhabitants, &c. To the emigrant to South Australia the volume before us will convey a clear and vivid conception of all he will require to learn relative to this beautiful and healthy colony; and it will be satisfactory to know that it has not been compiled from hearsay or written evidence, but from four years' active residence in the country as surveyor and engineer; and being employed in laying out the proposed line of railway from Adelaide to the mines, he has had numerous opportunities of making himself acquainted with the various interests in the colony, and the statistical matter connected with the imports, exports, trade, agriculture, and mining, which he has brought down to a year later than we believe, any work yet published. Several pages at the end are devoted to advice and information to emigrants, with miscellaneous information, principally extracted from the circular issued by her Majesty's Colonization Commissioners, and by the aid of which, in addition to the general information given, the intended emigrant can be at no loss how to take the best measures to secure for himself a future comfortable home. In addition to the utility of this little volume to persons intending to go to South Australia, from its containing a graphic description of the colony, and bringing information down to the latest possible moment, it will be found of considerable interest to the general reader.

RAILWAY ACCIDENTS.—By a careful analysis of the returns made to the Office of Commissioners of Railways, it appears that, of the 112 persons killed, and 120 injured, on all the railways open for public traffic in Great Britain and Ireland, during the half-year ending the 31st December, 1848, there were—3 passengers killed, and 68 injured from causes beyond their own control; 7 passengers killed, and 5 injured, owing to their own misconduct, or want of caution; 6 servants of companies or of contractors killed, and 18 injured, from causes beyond their own control; 73 servants of companies or of contractors killed, and 24 injured, owing to their own misconduct or want of caution; 23 trespassers and other persons, neither passengers nor servants, killed, and 5 injured, by improperly crossing or standing on the railway; total, 112 killed; 120 injured. The number of passengers conveyed during the half-year amounted to 31,524,641. The number of miles of railway open on the 30th June, 1848, was 4357; the number of miles open on the 31st December, was 5007; increase, during the six months, 650 miles.

ARDWICK BRANCH OF THE LANCASHIRE AND YORKSHIRE.—On Thursday last the last brick of the Ardwick Viaduct, on this line, was set by Mrs. W. H. Hutton, and the last stone was laid by Mrs. Benjamin Hemmingsway, after which the usual rejoicings took place at the General Birch Inn. The first brick of this viaduct was laid by Mrs. Hutton on the 9th of June, 1847, so that little more than a year and a half has elapsed between the laying of the first and last bricks, including four months that the works were suspended. This viaduct consists of 57 brick arches, one tubular girder bridge, one flat iron girder bridge, and three cast-iron arches, forming a junction with the Manchester and Birmingham Railway, at Chancery-lane, Ardwick, and on the whole is a very pretty piece of workmanship. James Brunlees, Esq., has been the resident engineer, and Messrs. Newell, Hemmingsway, and Pearson the contractors, who are also, we believe, the contractors for the stone-work of the Britannia-Bridge, on the Chester and Holyhead Railway.—Manchester Guardian.

ENGINEERING.—From what we learn, the engineers are beginning to feel the benefit of a revival in their trade, after the long and tiresome winter of dulness. W. R. Napier has received orders for two colossal steamers for the New York trade, while Messrs. Napier and Crichton, Washington-street, have received orders for no less than 10 iron lighters for the Forth and Clyde Canal Company; and have also on hand a screw steamer to be called the *Guy Fawkes*, nearly ready for launching. We sincerely hope that these orders are but the beginning of a good summer trade for our mechanics and engineers.—North British Mail.



## Proceedings of Public Companies.

**MEETINGS DURING THE ENSUING WEEK.**  
**THIS DAY.**.....Economic Life Assurance Company—Radley's Hotel, at Two.  
**MONDAY.**.....Steam-Ship Owners' Association—offices, at One.  
**WEDNESDAY.**.....Alliance British and Foreign Assurance Company—offices, at Twelve.  
**THURSDAY.**.....Gaspé Fishery and Coal Mining Company—offices, at Twelve.  
**FRIDAY.**.....Chester and Holyhead Railway—offices, at One.

[The meetings of Mining Companies are inserted among the Mining Intelligence.]

### NEW BRUNSWICK AND NOVA SCOTIA LAND COMPANY.

The annual meeting of this company took place at the offices, Copthall-court, London, on Thursday, the 8th inst.

JOHN MOXON, Esq., in the chair.

The advertisement calling the meeting was read, and the following report of the directors was submitted to the meeting:—

The last annual report stated that the balance of cash against the company (after re) ceiving 1705*l.* on the call of 1 per cent., and paying the loans due to the bankers, 1500*l.* would probably amount to 310*l.* In order to compare this with the actual state of the cash, we take first the balance in favour of the company remaining at the bankers on the 31st December last .....£330 7 0  
 Add balance on the above estimated amount of call not paid up .....89 10 0

Making the balance to be apparently in favour of the company .....£419 17 0  
 (Instead of the estimated debit of £310.)

Against this amount of £419 17*s.* we regret to say, the following debits must be placed:—  
 1. Portions of the bankers' loan, which we have not been enabled to discharge .....£300 0 0  
 2. Three bills drawn from Stanley in 1848, payable in 1849 .....290 0 0  
 3. Liabilities outstanding at Stanley, 31st Dec., 1848, 596*l.* currency .....500 0 0

Total .....£1290 0 0  
 Instead of 310*l.*, therefore, the balance contained in last year's report, the actual balance against the company on the 31st Dec. last, amounted to 870*l.* 3*s.*

The cash account for the year 1849, up to the 31st Dec. next, may, therefore, be estimated as follows:—viz.:  
 Balance at Messrs. Williams, Deacon, and Co., 31st December, 1848 .....£330 7 0  
 Balance of call outstanding, as estimated .....89 10 0

Total .....£419 17 0

Three bills drawn by Captain Hayne, in 1848, payable this year .....£290 0 0  
 Further drafts authorised, and which must probably be authorised, in order to pay balances outstanding at Stanley, 31st December .....500 0 0  
 Loan still due to Messrs. Williams, Deacon, and Co. ....500 0 0  
 Expenses in London for the year .....304 0 0  
 Sundries outstanding .....76 0 0

Total .....£1670 0 0

Probable deficiency, December 31st, 1849, 1250*l.*, except Captain Hayne should be able to realise his estimated receipt for 1849 in which case the above balance debit would be reduced to 540*l.*

As some revival in the timber trade and land receipts may be looked for in 1849, and some arrears of 1848 may, therefore, be received in the course of the present year, whereby the above estimated deficiency may be diminished, the directors' opinion is, that it may be better to postpone the further call of £1 per cent. on the capital stock as long as possible during the present year, or to delay it until the commencement of 1850, if the payments should not, in the meantime, be pressed upon the company.

On comparing the items of the London account-sheet, laid before the present meeting, with the estimate of payments contained in the last annual report, it will be observed that, in pursuance of the strict economy exercised, the total office payments in London, estimated at 430*l.*, have amounted to no more than 387*l.* 13*s.* 10*d.*, against which the directors regret that they were compelled to authorise drafts from Stanley in excess of estimate, amounting to 179*l.* 13*s.* 10*d.*. Capt. Hayne's estimate of expenditure for 1848 was 1136*l.* currency; and the actual expenditure having been 1248*l.*, there is an excess, owing chiefly to an increased charge for district rates. His estimated receipt for 1848 was 1170*l.*; and the actual receipt having amounted to no more than 483*l.* 16*s.* 6*d.*, there was a deficiency altogether on the year of 586*l.* currency = 670*l.* sterling, which represents the bills drawn on London, 1848, 179*l.*, and the balances outstanding of 500*l.* on the 31st December last. The extraordinary falling off in the Stanley receipt is owing to the prostration of the timber trade, to the general distress in agriculture and trade prevailing throughout the province in 1848—far exceeding the difficulties experienced in 1842, and more especially to the present inability of the company's lessees to pay their timber rents and dues. Under these circumstances, the directors have been compelled to make further arrangements, which will reduce the expenditure from 400*l.* to 360*l.* in 1849, with a further prospective reduction of about 80*l.* in 1850. Believing also that no reliance can be placed, at all events for the present, upon mere estimates of receipt at Stanley, the directors wrote to Capt. Hayne on the 7th February, that it is absolutely necessary to regulate the expenditure of 1849 as much as possible, according to the inconsiderable receipts of the previous year—viz., 483*l.*; that they were compelled to lay aside his estimate of receipt for 1849, amounting to 1210*l.*, and to reduce his estimate of expenditure from 863*l.* to 592*l.*, with a further prospective reduction of about 60*l.* in 1850 if circumstances should require.

With respect to the reductions of salary, both at Stanley and in London, the directors have only to add, that it is with the greatest reluctance they have been compelled, by the low state of the company's receipts in the province, to propose any further reductions. They trust that, under a sense of the absolute necessity of the case, the company's affairs may be impaired as little as possible, and they add their full belief that it will be expedient for the company's interests, that some of the payments should be increased as soon as the receipts will permit. The following were the gross receipts at Stanley in the years named, accurate to the third decimal part of a penny:—Received in 1840, 1071*l.* currency; 1842, 671*l.*; 1844, 1534*l.*; 1847, 1366*l.*; 1848, 475*l.*

The following account shows the amount expended at Stanley in the years named under the four principal heads of towns, roads, and bridges, salaries, law, and county rates:—Expended in 1840, 1873*l.*; 1842, 1390*l.*; 1844, 1675*l.*; 1847, 1265*l.*; 1848, 919*l.*

In consequence of the heavy tax imposed last year upon ships conveying emigrants by the Legislature of New Brunswick, in common with all the North American provinces and states, the number of emigrants sent in the province was very much reduced. Instead of the usual average of 7500, the total number seems not to have exceeded 5000—the whole of whom, instead of being absorbed, as in ordinary years, in the population and employment of the country, went, on the contrary, to the United States; and nothing shows more conclusively the extent of the reaction and depression prevailing in New Brunswick than the fact, that more than 8000 persons, already settled, left the province, and emigrated to the United States in the past year.

Notwithstanding these circumstances, and probably because the views of the public generally in the province, headed by the authorities and private societies, are much converted from the delusions attendant on the almost exclusive devotion to the timber trade, and that their efforts are turning to the more steady and profitable pursuits of agriculture—the sales of land by this company, during 1848, amounted to 2869 acres, which were sold for 676*l.* 19*s.*, at prices varying from 4*s.* 6*d.* to 10*s.* per acre. This quantity exceeds the sales of 1847 by 1051 acres. The total quantity of land sold from the commencement amounts to 25,278 acres, and the quantity of land still remaining unsold is 530,885, 600 acres having been resumed during the past year, and forfeited upon non-settlement, or non-payment of instalments. Capt. Hayne's report also states, that the settlers now possess altogether 3837 acres of good land cleared, the total value of which may be estimated at 17,200*l.* The total sum received from land sales from the commencement up to Dec., 31, 1848, is 4754*l.* 11*s.* 3*d.*, and the sum still remaining due amounts to 4382*l.* 7*s.* 3*d.*

Having instructed Capt. Hayne to discontinue the collection of general returns of stock and crops possessed by the settlers, in order to economise, as much as possible, the travelling expenses; and because there was also, in several cases, a want of precision, the directors now lay before the meeting a special return respecting 27 settlers, arising out of a report made by the judges, who acted in October, 1848, in the award of agricultural prizes:—Wheat, 254 acres; buck wheat, 421 ditto; barley, 9 ditto; rye, 3 ditto; beans and Indian corn, 72 ditto; potatoes, 303 ditto; turnips, 74 ditto; hay, 2254 tons; cattle, 146; horses, 22; sheep, 246; pigs, 96; land cleared in all, 1082 acres: ditto stumped and ploughed, 1634 acres.

With regard to the state of the settlements generally, we extract from Capt. Hayne's report and correspondence of last year, as follows:—“The crops of 1848 were below the average, and wheat more particularly entirely failed throughout the province. Notwithstanding these casualties of the season, agriculture and management of farms is decidedly improved in all the company's settlements, and much activity was displayed in competing for the several agricultural prizes into which the company's vote of 25*l.* was divided. Stanley and the neighbourhood are also more particularly improved, and the work now going forward among the principal settlers there is bringing that district into notice, as a good farming country; the same with the settlements at Bloomfield and upon the south-west Miramichi. The honourable the House of Assembly have continued their votes of money towards the improvement of roads, &c., in the company's tract, in the session of 1848, having voted 400*l.* for main roads, 50*l.* for sundry bye-roads, 26*l.* towards the maintenance of a stage communication between Stanley and Fredericton, and 80*l.* to the poor of Stanley parish, for the purchase of seeds, &c. In consequence of these appropriations (added to the previous expenditure of the company) there is a good road now established, leading from Stanley towards Campbell, which Capt. Hayne hopes will be gradually carried out to the south-west Miramichi, by continuing the line in the present season in the direction of the Bloomfield settlement.”

In continuing the management of the company's affairs for the ensuing 12 months, the directors will keep in view the expediency of retaining such an establishment, however reduced, as may enable the company to maintain the supervision of the tract of land, and the care of the accounts and correspondence in the province and in London, until the commencement of large public works, chiefly the Halifax and Quebec Railway, shall lead to a more active demand for land.

With regard to railways, the directors do not find that the survey of the projected line from St. John to Fredericton, has been followed by any action or encouragement from the local Government. A line has been surveyed in another direction, from St. John towards the bend of Petitedou. With respect to the main line—viz., from Halifax to Quebec, it appears to have been finally recommended, during the past year, that the portion of line running through the province of New Brunswick—shall be made a part of the company's tract: and some official correspondence appears to be proceeding, with a view of obtaining a separate vote, by each of the three provincial Legislatures, of a certain sum per annum for the payment of interest, provided Her Majesty's Government will furnish the capital required.

The conclusion to be drawn from all that has occurred on this subject, during the past three or four years, appears to be, that the vast improvements carrying on in the communications by railway and canal between the city of New York and the lakes, combined with the active progress which is also making in the line of railway between Montreal and the harbour of Portland, in the State of Maine, will compel the provincial authorities and Her Majesty's Government to come to some speedy decision—not only with regard to greater facilities in the navigation of the River St. Lawrence, but also to the establishment of the Halifax and Quebec Railway, whereby the time now consumed in conveying produce between Great Britain and the Canada may be materially saved at all seasons of the year.

The directors beg leave further to report, that the following directors and auditors met on the 21st day by rotation—viz.: Richard Godson, John Moxon, Thomas Perham, Luxmoore Hallett, Samuel Eastace Magan, James William Ogle, and Thomas Potts, Esqs., directors; John Norbury, Esq., auditor—all of whom, being re-eligible, offer themselves accordingly.

The annual cash accounts having been read, the CHAIRMAN said, that as the directors' report entered fully into the company's affairs for the past year, he would not trouble the proprietors present by advertizing to any more than one portion, which, in fact, repeated on the present occasion the advice in

which the proprietors appeared to concur at the annual meeting in 1848—viz.: that, in using the strictest economy, it was highly expedient that the company should continue to maintain such an establishment in the province and in London as would provide for the care of the tract of land, and also provide the means, in London, of keeping up the correspondence requisite in communications with parties intending to emigrate. With the experience obtained in the years which had elapsed since the company was first incorporated, and seeing the present state of colonial affairs and business in British North America, the directors could not hold out any expectations for the present of rapid or favourable sales of land, although they were justified in expecting that the pressure which existed to such an extent in 1848 would be so far relieved in the present year, as to give the proprietors a fair prospect of seeing the expenses covered by the receipts.

With regard to the future, the opinion of the directors was, that (by adhering for some time longer to the plan of management which they recommended, and not the less strongly, as they held a large interest themselves in the capital stock) the company would before long arrive at a period when, by the commencement of public works on a large scale, such as the Halifax and Quebec Railway, they would be enabled to make sales much more rapidly, and on much better terms. He (the chairman) then drew the attention of the meeting to the official report and correspondence, accompanied by a map of the proposed line of railway, which were on the table. That report recommended it was true that the line should pass to the eastward of the company's tract, instead of through it; but the line did not appear to him to be yet fully determined upon; and seemed, by one of the official letters, to be much dissented from in the province itself; but that it appeared to the directors, that whatever line might be finally adopted, the more rapid settlement of the new Brunswick, and, consequently, of their tract, would be much facilitated. Before concluding the few remarks which he had to offer on the transactions of the past year, he (the chairman) begged to advert to the sales of land in 1848, which exceeded those of 1847 by about 1000 acres, and this notwithstanding the severe pressure and distress which existed throughout the colony last year, owing to the extremely low prices of timber here; but he hoped that all parties in the province were aware of the mischief resulting from their exclusive devotion hitherto to the timber business; and he expected also, from what he had seen of the reports and proceedings of agricultural societies, &c., that the colonists would for the future carry on the timber trade more as an exception, and rely on their great landed resources, and upon the steady cultivation of their fine soil, from which they could not fail to derive a steady and excellent support at all times. He (the chairman), concluded by moving the adoption of the report and accounts, which had just been read to the meeting; which was seconded by Mr. SMITH (one of the directors), who reminded the meeting that although the result of last year had brought more than the usual disappointment to the proprietors; yet, looking to the position of the province, and the certainty, as it appeared to him, that it must soon be made the means of communication between England and the Canadas, and, therefore, would become the high road for emigration to the British provinces, he had never seen any cause for despondency; but, on the contrary, believed that the time was near at hand when the commencement of the line of railway, which was at present so much discussed, would lead to a great improvement in the circumstances of this company. (Hear, hear.)

The report having been adopted, Messrs. R. Godson, M.P., Moxon, Hallett, Magan, Ogle, and Potts, the six directors who retired by rotation, and Mr. Norbury, who retired as auditor, were then re-elected unanimously.

Richard Godson, Esq., M.P., was then elected as governor, and John Moxon, Esq., as deputy governor.

Mr. W. A. HANKEY moved a vote of thanks to the chairman and directors, which was seconded by Mr. L. P. WILSON, and passed unanimously.

The CHAIRMAN, in returning thanks for himself and the board of directors generally, said, that under the discouraging circumstances of the last year, they felt the more strongly, that the unanimous approval of the stockholders was a great encouragement to them to persevere, until a more prosperous time might arrive, and that he regretted more especially, as he had served on the board of directors at times during 15 years since the company had been formed, that they had not long before this more cheering accounts to lay before them.—The meeting then separated.

### THAMES TUNNEL COMPANY.

The annual meeting of shareholders was held at Radley's Hotel, Bridge-street, Blackfriars, on Tuesday last, the 6th inst.

BENJAMIN HAWES, Esq., in the chair.

Mr. MASON (the secretary) having read the advertisement convening the meeting, submitted the accounts, from which it appeared that the tolls for the year ending Dec. 31, 1848, had been 3796*l.* 8*s.* 3*d.*; rent of houses on company's property, 432*l.* 17*s.* 3*d.*; rent of stalls in Tunnel, 452*l.* 15*s.* 7*d.*; sundry receipts, and a balance from the previous account, made the total 5493*l.* 15*s.* 8*d.*

—The expenditure was—machinery, 786*l.* 0*s.* 5*d.*; repairs, 72*l.* 3*s.* 11*d.*; coals for engine, 230*l.* 8*s.*; gas, 804*l.* 13*s.* 2*d.*; directors, 210*l.* 10*s.*; clerk, 185*l.*; salaries, 963*l.* 17*s.*; rent, 100*l.*; Government, 849*l.* 2*s.* 8*d.*; and sundry payments and a balance in hand of 541*l.* 19*s.* 2*d.*—5439*l.* 15*s.* 8*d.*

The CHAIRMAN said, it was with pleasure the directors met the shareholders once more, though they had but little to communicate. The tunnel, he was happy to say, was in excellent condition; indeed, better than ever, and more free from water; in other respects they remained just as they were, and their position, though no worse than it had been, was by no means flattering. The tolls in amount were 196*l.* less in the year 1848 than in 1847; they had however contested, and reduced their amount of rating to taxes and local rates from 1205*l.* to 440*l.*; they had also reduced the cost of their gas, 67*l.*; the average number of passengers was about 18,000 per week.

Mr. DEUCE said, he was an original proprietor, but had never attended these meetings; he wished to be informed the total amount expended, and the sum owing to Government.

The CHAIRMAN said, the total expenditure on capital account was 443,000*l.*, and the sums borrowed from Government amounted to 260,000*l.*

Mr. GOLDSMID suggested that the accounts should be printed and circulated among the proprietors previous to meeting, as was now practised by most public companies.

Mr. ADAMS objected on the ground, that the Government were now not receiving a tithe of their interest, and every additional expense further reduced it; the general opinion, however, was in favour of the plan, as the expense was very trifling, and the directors consented. Mr. Adams, in proposing a vote of thanks to the directors, suggested whether, as the debt due the Government was decidedly a bad one, such as a commercial house would write off the ledger, the treasury could not be induced to forego it altogether, and he thought, if left without that encumbrance, they might do something with the tunnel.

The CHAIRMAN said, he feared it was a bad time to induce the Government to forego any claim. He had at one time an opportunity of obtaining something like 230,000*l.* for the tunnel, which would have paid the shareholders and the Government 10*s.* in the 1*l.*; but the commissioners would not consent to the sale without taking the whole proceeds, and leaving the shareholders the entire loss. The offer was made in consequence of a plan for uniting the northern and southern railways, which were only 1½ mile apart, and could be advantageously united by the tunnel.—The accounts were then adopted.

A. L. Wollaston, J. Barker, and J. L. Jones, Esqs., were re-elected directors for four years; G. Vaughan, W. Whitmore, and G. Gillineau, Esqs., were re-elected auditors; and a vote of thanks to the directors having passed unanimously, the meeting separated.

**SIMPLIFIED METHOD OF EMPLOYING CHARCOAL IN GALVANIC APPARATUS.**—It is well known that M. Bunsen was the first who made known the mineral charcoal apparatus for the production of a powerful and constant electric current; but this apparatus is expensive and soon wears out. It has also been found that the attempt to set it in action is not always attended with success. The platinum apparatus is less easily broken; but the metal in sheets is soft and pliant. The objections against it seem to be, that it requires a very large quantity of nitric acid and zinc to keep it in action; and that its action ceases, after lasting about eight or ten hours, from the formation of sulphate of zinc, which is deposited on the cylinder of the same metal, and prevents the development of electricity. M. H. Reinsch only uses coarse coke powder, which he puts in an earthen capsule, and damps well with ordinary aquafortis. In this acidified coke powder he places a small piece or cylinder of coke, at the end of which a copper wire is rolled. The action is very extraordinary. The discharging cylinder of an electro-magnetic machine, made according to M. Desaga's model, cannot be held with dry hands; and a capsule or cell of this description does not appear, after three days' activity, to be at all diminished in intensity. As the powdered coke costs a mere nothing, and will always serve again (for when the acid has become gradually weaker, it is sufficient to dry it in the air, and damp it again with aquafortis, to produce a constant current), it will be seen that an immense advantage is thus presented to persons using galvanism, as the expense of developing the electric action is considerably reduced; and if ever the application of magnetism, as a motive power is realised, M. Reinsch's valuable observations will be of very great importance.—*Technologist.*

**PORTABLE GAS-LIGHT.**—We have witnessed in operation a lamp, of a novel and ingenious description, which requires neither wick or glass, and gives out a brilliant white and dazzling flame. It consists of a vessel placed at the top of a tube, similar to a gas-pipe, and containing a highly volatile spirit of naphtha, or, as the patentee terms it, “mineral spirit.” The tube terminates in a burner, consisting of a horizontal or circular line of orifices, giving a flat and extended flame, or an annular one; and there is a tap for admitting the spirit in a minute stream to the burner. As the spirit comes in contact with the first connection to the heated burner it becomes volatilised, and escapes through the burner in vapour, or hydro-carbon gas, where it is consumed. It is necessary, in the first instance, to heat the burner, and there is a small cup below it to hold a few drops of the spirit, which is set fire to for the purpose, after which the gas undergoing combustion supplies the necessary heat.

## The Compendium of British Mining.

ORIGINALLY COMPILED AND PUBLISHED IN 1843.

REVISED, CORRECTED, AND ENLARGED FOR THE “MINING JOURNAL,” BY J. Y. WATSON, ESQ., F.G.S.

### CAMBORNE DISTRICT.

**NORTH POOL TIN AND COPPER MINE** is situate in the parish of Illogan. It is divided into 100 shares; 45*l.* per share paid up; market value 600*l.* Conducted on the Cost-book System. Purser, H. Borrow, Esq., Truro. Principal agent, Captain James Evans; other agents, James Evans, jun., and John Nancarrow. The sett, which is a mile long on the course of the lodes, and 180 to 200 fathoms wide, is held on lease from the Hon. Anna Maria Agar, for 21 years, from the 11th January, 1845, at 1-15th dues. The machinery consists of one pumping engine, 50-inch cylinder, and a steam winch and crusher. Operations were commenced in June, 1843, and the total outlay of the shareholders was 4500*l.*, when large returns were made, and which, to the end of December, 1848, have been:—

Copper, 9146 tons 4 cwt. 2 qrs., yielding .....£37,412 10 8  
 Tin, 7 tons 3 cwt. 4 qrs., yielding .....14 18 3

Total returns .....£37,427 8 8

Out of this, 13,500*l.*, or 135*l.* per share, was divided as profit, to the end of December, 1848. The first dividend of profit this year was in February, and amounted to 2000*l.*, or 20*l.* per share.

Situated in a rich mineral district, North Pool is an extraordinary instance of successful mining upon a trifling outlay, and in a short space of time. It will be observed, that although operations were partially commenced in 1843 (under the name, I believe, of Wheal Raven), the lease is dated in 1845; and in little more than three years near 40,000*l.* worth of ore have been returned, large reserves made, and the present profits are at the rate of 12,000*l.* a year. When the mine first proved rich, the shares rose, in less than 12 months, from 40*l.* to 400*l.* per share.

**WEST TOLGUS**, adjoining, and to the north of, North Pool, is a large sett, nearly a mile on the course of the lode, and 200 fathoms wide. In 256 shares. W. Richards, Esq., manager. Held on lease, for 21 years, from the Hon. Anna Maria Agar, at 1-15th dues. A large outlay, nearly 500*l.* per share, has been expended here in erecting an engine and sinking a shaft, which proved, however, to be in the wrong place; and the operations are now confined to driving an adit to intersect the lodes passing through the sett, and which can be done at a trifling expense. The Great Tolgus lode passes through the sett; and as the adit is pretty deep, should it be intersected, West Tolgus may some day prove a good speculation.

Before the setts of North Pool and West Tolgus were granted, the late Captain Reynolds had, it is said, the choice of ground, and took West Tolgus, whilst Captain Evans chose North Pool.

To the north of West Tolgus, and on parallel lodes to it and to North Pool, is **WHEAL MAUD**, where, a few years since, a party drove a shallow adit upon a fine lode, composed of gossan and beautiful stones of copper ore, some of which, when I saw them, in 1845, were of very large size. The sett, however, was in weak hands, and was abandoned for want of means. I am told, however, that the company is now trying to obtain a lease, and no young mine in the neighbourhood is more worthy of an effectual trial.

To the north of Wheal Maud is **EAST STROX**, where a small steam-engine was erected, and several tons of ore returned, under the management of Capt. Evans, of North Pool; but, through the difficulty of obtaining calls from some of the shareholders, the engine is idle at present.

[To be continued in next week's Mining Journal.]

## Mining Correspondence.

### BRITISH MINES.

**AYLSBOROUGH.**—Captain J. Spargo reports—Our shaft is down about 6 fms. under the 10 fm. level, in which we have a very rich lode just come in the shaft, much richer and larger than last reported; it is now about 1 ft. 6 in. wide, and likely to continue. The south lode is producing some good stones of tin. The stopes in the back of the 10 fm. level are looking well, producing good stamps' work.

**BARRISTOWN.**—Captain T. Angove (March 2) reports—The lode in the 16 fm. level end east is about 2 ft. wide, and producing over 1 ton of lead per fm., towards the bottom of the end it is not so good; in the winze, holed behind this end to the adit level, the lode is very good for 3 fms. over the back, but we are not able to report upon the value of it over that. We have not discovered the main part of the lode in the adit level end driving south, although we have driven the winze through several branches of carbonate of iron, carrying small particles of lead—the ground looks very favourable for making ore about those branches—we have driven about 4 fms. south in this end since we cut the adit. The pitches look much the same as last reported. We are in treaty for a vessel to take 30 tons of lead to Chester River.

**BEDFORD UNITED.**—The Manager (March 5) furnishes a copy of the usual monthly survey, held on Saturday last, when the following pitches and bargains were set:—To sink the engine-shaft 4 ft., and cut the trip flat 12 ft. long, 10 feet wide, and 6 ft. deep, by six men, at 30*l.* the bargain. To drive the cross-cut south, in the 103 fathom level, 4 fms. stent, by six men, at 6*l.* 10*s.* per fm.; this cross-cut is progressing favourably, and the ground improved for driving; we may, therefore, expect to cut the lode towards the end of such month. To drive east, in the 25 fm. level, 2 ft. stent, by six men, at 3*l.* 6*s.* per fm.; the lode in this end is assuming a much more promising appearance than for some time past, and there is no doubt but we are near to the course of ore we had in the level above. To drive east, in the 70 fathom level, 2 fathoms stent, by six men, at 7*l.* per fathom; the lode in this end is composed of spar, capot, munda, and some ore, and there are slight indications of improvement. To sink a winze in the bottom of the 90 fathom level, 2 fathoms stent, by nine men, at 2*s.* in the pound. The 80 fathom level east is suspended. The following are pitches that were set:—In the 90 fathom level—to four men at 5*s.* 6*d.*, four men at 5*s.*, four men at 1*s.*, four men at 1*s.* 6*d.*, and two men at 1*s.* 6*d.*. In the 50 fm. level—to six men at 6*s.* 6*d.*, four men at 1*s.*, and two men at 1*s.* 6*d.*. In the 38 fm. level—to two men at 1*s.* 6*d.*. In the 47 fm. level—to two men at 1*s.* 6*d.*. The other pitches were not reset, but continued for another month at former tribute—viz.: all at 1*s.* 6*d.*. The steam-whim engine continues to work well, and is giving us great satisfaction. We have experienced some little delay in obtaining the castings for the crusher, but they are now received, and I trust all will be complete in the course of a week. The ore sold on the 24th Feb., computed at 115 tons, weighed 115 tons 13 cwt. 2 qrs., and those sampled on Friday last, December ore, 115*l.* 13*s.* 2*d.*, and sampled Jan. ore, computed 113 tons (21 cwt.) of superior quality ore.

**BWLCH CONSOLS.**—Capt. Matthew Francis (March 5) reports—We let our bargains, on Saturday, to 90 men. The additional number are 12, driving east and west upon the ore discovered by the cross-cut north to the east of Doran's shaft, and in driving east and west from the winze at the 30 fm. level, 14 fms. west of the engine-shaft. The stopes in the different levels, to the east of the engine-shaft, are yielding the average quantity of ore, and the ore is very good on the ground stoping in the back of the 25 fm. level, west of the engine-shaft. The ore is not quite so good in the ends driving east and west from the 15 cross-cut; but I do not attach much importance to this, as the lodes naturally are subject to such changes. Other things do not require notice, as there is no alteration in them worth adverting to. The pillars of masonry work for the new crushing-mill are building as fast as possible; the new dry one is completed, and answers the purpose for which it was intended very satisfactorily. I see no reason to expect that we shall have any change in our raisings or dressing this month.

**CEFN GWYN.**—Captain S. Trowethan (March 5) reports—The adit level, driving west on the lode, is rather improved within the last week; the lode is 6 ft. wide, producing some good stones of ore. I have suspended the driving of the level east to make a better trial in the bottom, as it appears several good branches are forming together going down, and I expect shortly in sinking to have a good lode. The winze we are now sinking is very ore; all we are breaking at present is kept for dressing.

**CWM ERFIN.**—Capt. Abalom Francis and Samuel Nicholls (March 5) report—Our 20 fm. level east contains a small quantity of ore, but nothing to put a value on; the stope behind this end is not quite so good as when last reported; but is a pretty fair stope at present. The rise over the 30 fm. level west still yields from 6 to 7 cwt. of ore per fm. The stopes over the 10 fm. level are not so good as they looked last week; for making a good bunch of tin. I have put six men to sink in the bottom of the adit level, about 30 fms. to the west of the footway shaft, where the old party had a good deposit of tin in driving the level, but they did not proceed to work under the bottoms. There is a good deposit of tin gone down in the bottom of the level. This is a very important feature in the mine, and I purpose to report more fully on this in my next. I have discovered a good branch of tin about 7 fms. to the south of our pitway shaft, underlying north, and the lode that we are sinking on is underlying south, and I calculate they will form a junction at from 10 to 15 fms. deep. I shall dial it to-morrow, and will give more particulars about it.

**DEVON AND COURTENAY.**—Capt. N. Seccombe (March 6) reports—The lode in the end, driving west, in the 40 fm. level, is 18 in. wide, composed of mus. &c. and spar, mixed with pebbles and spots of ore, not rich. In the end, driving east, in the 50 fm. level, on the south lode, the lode continues about 2 ft. wide, composed of capels, mixed with munda and spots of ore. There is no lode yet discovered in the end driving north on the cross-course to the 40 fm. level.

**EAST BIRCH TOR (TIN).**—Capt. T. Moyle (March 7) reports—We are now sinking our engine-shaft by nine men with all possible dispatch. We are carrying the shaft 18 ft. long on the course of the lode; by doing this we can sink it cheaper than carrying it 9 ft. long. We keep the winch kibble down with them, to save drawing the stuff with the tackle, and shall keep our stamps constantly at work. We have the branch that I informed you of some time since dropping into the lode, and it



about 10 in. wide, and seems, in depth, to be increasing in size—composed of spar, mica, and iron; we have saved some good work from it in the past week. This speaks very favourably for Thomas's lode, in the next level, as it is probable the branch will unite with it about that depth. Thomas's lode, in the next level, I am sorry to state, does not look so well as it did; a horse of killas has crossed it from the north, which has rather discoloured it; as this is a circumstance that often occurs, I hope, in my next, to report its having resumed its usual appearance. The lode is at present worth about 25¢ per fm. Tipple's stop, in the back of this level, looks just as usual; the men have been, the principal part of the past week, engaged securing ground, and putting in stull. I am glad to state, that the difficulties respecting the erection of a burning-house are all settled. We commenced clearing out foundation on Thursday.

**HERODSFOT.—**Capt. J. Medlen and P. Dunstan (March 5) report.—The lode in the 106 fm. level north is 1 ft. wide, rich for antimony, but poor for lead; in this level south the lode is small, but producing saving work. The stopes in the back of this level are somewhat improved since last report. The lode in the 94 north is 1 ft. wide, but poor; in this level south the lode is small, producing saving work; in this level, at Windsor's shaft, the lode is 2 ft. wide, producing good stoves of lead. The stopes in the back of this level are not so productive as before. The lode in the 82 fm. level north is about 1 ft. wide, yielding 1 ton per fm.; we have resumed clearing this level south, and hope to get to the end by the latter end of the week. The stopes in the back of this level will produce, on an average, about 1 ton per fm. The lode in the 72 fm. level north is 1 ft. wide, producing saving work; in this level, near the south end, we have driven a cross-cut 7 ft. west—we are now in the capels of the lode, and expect to cut it in a few days. The stopes in the back of this level will produce, on an average, about 1 ton per fm. The lode in the 62 fm. level, south of Windsor's shaft, is about 3 ft. wide, producing 1 ton per fm. On account of putting our new plunger lift to work, we have not been enabled to do much in our bottom levels during the past week; but the engine is now forcing the water fast, and we expect to resume our usual work in a day or two. Our last parcel of 110 tons has been sold to Messrs. Newton, Keates, and Co., at 11¢ 65 per ton.

**HOLMBUSH.—**Capt. W. Lean (March 6) reports.—I am glad to inform you we have got through the great cross-course, in the 123 fm. level, west of the diagonal shaft, and have set it out to drive at 77. 50, per fm., being in a beautiful white clay-slate stratum. The 120 fm. level cross-cut south, east of Hitchens shaft, is much the same as last reported—ground moderate. The lode in the 120 fm. level south, is 4 ft. wide, composed of quartz, prill, and lead, saving work. The lode in the 110 fm. level south, is 3 ft. wide, composed of can, prill, and stones of lead, saving work. In the 100 fm. level, we have driven 10 ft. 4 in. in the great cross-course—ground favourable, being set at 4¢ 10s. per fm., and we hope by the end of this month we shall get through it. The pitch in the bottom of the 120 fm. level is much the same as last reported on.

**KIRKCUDBRIGHTSHIRE.—**The agent (March 3) reports.—The lode in the 50 end, east of Stewart's, is 3 ft. wide, spotted with lead, jack, sulphur, &c.; the rock is not so black, and the lode much stronger and larger than where it entered the black rock in the 30 fm. level above. The lode in the 40, west of Keith's, is still larger than the end, with fine stones of ore in it, much the same as last week, about 4 cwt. or 5 cwt. of lead to the fm. We have made no discovery in the cross-cut north in the 30 end yet. The lode is improved, and taken the same men to dig on the new counter lode, until this end will be under Crouch's shaft by the end of this month. We have a fine lode in Stewart's shaft, of soft spar, with jack and stones of ore of a rich quality; it is in a kindly rock also for lead.

**KINGSETT AND BEDFORD.—**Capt. J. Spargo (March 5) reports.—I was at the mine on Saturday, and went through the different parts. The green lode is rather disordered, but is producing some good work for lead. I expect, in six or eight ft. driving, it will come again in its regular course. We have put on four men, at 25¢ per fm. We have also set two men on the eastern lode, at 6¢ 10s. per fm. for 2 fms.; I am thinking the ground will improve, as well as the lode, by the time that is driven; this end ought to have been driven before, as I believe we have a course of lead shortly. We have stopped the rise, and taken the same men to dig on the new counter lode, until they have driven 10 ft. 4 in. in the great cross-course—ground favourable, being set at 4¢ 10s. per fm., and we hope by the end of this month we shall get through it. It is a splendid looking lode indeed, and a great deal of lead in it; however, we shall see more of it in the course of a few days. The lode in the rise is looking excellent, but really I do not think that we ought to rise up, to discover a course of lead for other parties. You see we are rising to the north extremity of our set, and I am thinking if we were to rise 6 ft. farther, and then drive south a few fathoms, and then rise again, our rise would be much more in our own right. We shall be proving the lode in driving, as well as making backs for stopping, &c.; however, this I will write you after we have commenced rising again, which I hope will be in about a fortnight. We have got some good stopes open, where we can break a quantity of lead if necessary, and are still making more. The lode in the rise is now about 2 ft. wide, and much improved; in fact, it is good work, and will turn out lead fast. I am thinking of driving on the eastern lode (say 3 fms.), and then rise up, and there is not the least doubt but that we shall find the lode much richer than the first rise. We are greatly in want of a count-house. I have marked out the place for one about 50 fathoms south of Carpenter's shaft, and have gone into a calculation as to the expense of building, &c., thinking it necessary to build it 15 feet long by 12 ft. wide—the under room to be the store room. I shall wait your reply before commencing.—Capt. Harris (March 5) reports.—On Saturday Capt. Spargo was here, and went underground; he expressed himself highly pleased with the general appearance of the lodes, and assisted in setting the bargains, of which the following is a copy:—Henry Burn and partners, on the new lode, at Bedford at 5¢ 10s. per fm. Oliver's lode in the Bedford property is producing good work for lead; but we are obliged to stop it on account of driving on another lode that we have recently discovered in the adit, which is 3 ft. wide, and appears to be a counter. We intend to drive 2 fms., and then proceed with our rise again—the above lode is impregnated with lead throughout. There has been a captain from the west of Cornwall, and some other gentlemen, here underground; I am given to understand that the captain's opinion is favourable. If this lode continues as at present, it will pay well. We have recommenced driving north on the eastern lode, which is 4 ft. wide, producing good stones of lead. The lode near the green is somewhat disordered by a cross branch, but is producing good work for lead, and spotted with copper.

**LAMERHOVE.—**Capt. J. Tabb (March 7) reports.—We have sunk this last fortnight in the engine-shaft about 5 ft.—ground at present favourable for sinking. Davey's shaft is about 14 ft. below the 40 fathom level, and we intend fixing the 14-ft. plunger here this week. The two shafts are progressing favourably; and, after the plunger being fixed, I think we shall sink in each shaft from 24 to 3 fms. monthly.

**LEWIS.—**Capt. S. S. Neill (March 3) reports.—The 70 fm. level, east of the sump-shaft, on the south branch, is worth 3¢ per fm.; the lode in the 70 west, from sump-whim-shaft, in the south branch, is small and unproductive. Since my last, in the 60, south from sump-shaft, we have intersected the south branch, and find it to be 3 ft. wide, worth 40¢ per fathom; we have extended the cross-cut south 2 fms. of the south branch, and cut Cock's branch, which is worth 12¢ per fm.; the lode in the 60, east of sump-whim-shaft, on Cock's branch, is 18 in. wide, worth 10¢ per fm.; the lode in the 60, west of the sump-whim-shaft, on the south branch, is 1 ft. wide, producing some good quality tinstuff; in the winze, sinking below the 60, on the south branch, the lode is 5 ft. wide, worth 45¢ per fm. The lode in the 50 east, on Cock's branch, is 2 ft. wide, worth 13¢ per fm.; the lode in the winze, sinking below the 50, on Cock's branch, is 1 ft. wide, worth 6¢ per fm.; in the 50 west, on the south branch, the lode is small and unproductive; the lode in the winze sinking below the 50, on the south branch, is 15 in. wide, worth 8¢ per fathom; the other bargains in the mine are without alterations worthy of notice.

**LWYN MALEES.—**Capt. H. Francis (March 3) reports.—Our 14 fathom level west is in a fine lode, composed of spar, intermixed with strong solid lumps of ore, 6 ft. wide, and has every appearance of continuing; this level is now 10 fms. west from the London shaft, and the lode is 14 ft. below the 40 fathom level, and we intend fixing the same good course of ore. We find the water getting troublesome in this winze; but when we have the pumps in the London shaft acting, the water will be diminished, and we shall be enabled to sink the winze with more speed. The London shaft will be in a position to commence sinking by next Monday, and I expect we shall sink at the rate of 2 fms. per month, and be down our proposed depth, to satisfactorily prove the mine, by the end of September. We have about 12 tons of clean ore, and a large quantity drawn up on the surface; but, in consequence of the great scarcity of dressers, caused by the increase in the price of ore, we are unable to proceed faster at present.

**MENDIP HILLS.—**Capt. F. C. Harpur (March 5) reports.—I have nothing particular to inform you respecting the lode in the rise above the 30 fm. level, being about 5 ft. wide, consisting chiefly of flint, with a few sprigs of lead at times. In the slag department we have a pile of tolerable good slag prepared for the furnaces, which I intend smelting about the middle part of the present week, so as to forward the proceeds of the same to Bristol, with the parcel of lead we have already on hand. In the slag ground we are still laying open the cutting towards the more productive part of the valley, where we find the beds of stuff continue about 15 ft. thick, intermixed with slag and slimes, gradually improving in quality as we proceed in that direction. In the slag ground we have sunk a number of trial pits in different parts of the valley. A few tons of the stuff from these pits have been taken to the dressing floors and cleaned, which is found to contain a quantity of good slimes, and a portion of wheat. I have made an assay of each, the slimes I find contain 33 per cent. of metal, and the slag 23 per cent. Active preparations are now being made to fix a dressing-floor on the spot, in order to prove its value more effectually, the result of which will be made known to you in due course.

**PENCRAIG-DU AND CAENANT.—**Capt. M. Francis (March 5) reports.—The adit at Pencraig-du is in a very good course of ore, yielding about 1 ton to the fm. The stopes in Caenant east of the rise have improved; there is now some good ore ground in them, but the best is still further eastward.

**SOUTH WHEAL TRELAWNY.—**Captain W. Jenkin (March 5) reports.—The lode in the 30 fm. level is 2 ft. wide, composed of fluor-spar, barytes, killas, mica, and spots of lead; it is also discharging a great deal more water, and ground more favourable. We are also driving cross-cut west at the same level; but have not yet intersected any more lodes or branches.

**TRELEIGH CONSOLS.—**Capt. W. Symons (March 5) reports.—Garden's shaft, below the 113, is sinking in the country. In the 113 fm. level, west of ditto, lode about 4 ft. wide, with stones of ore only. In the 100, west of ditto, nothing done this week, men employed elsewhere. In the 80 fm. level, west of ditto, we are cross-cutting to a north part of the lode, and expect to cut it in 6 fms. more. In the 60, west of ditto, lode 3 ft. wide, with a very favourable appearance, but little ore. In the 20, east of Wheelparent shaft, lode 3 ft. wide, in general spar and mica, looking kindly; in the 30, west of ditto, lode 3 ft. wide, with a very favourable appearance, and good stones of ore. In the winze below the adit, lode 4 ft. wide, in branches, mixed with killas; in the rise, above the adit, lode 18 in. wide, worth 5¢ per fm.—working, by 2 men, at 20¢ per fm. and 2s. tribute. We shall sample on Tuesday next about 100 tons of ore.

**WHEAL MARY ANN.—**Capt. Peter Clymo (March 5) reports.—The lode in the 60 fm. level, south of Barrett's shaft, is 3 ft. wide, and will produce 15 cwt. of lead per fm. Barrett's shaft is 2 ft. wide, and will produce 5 cwt. of lead per fm.; the stopes in the back of this level are looking well, and will produce 3 tons of lead per fathom. Pollard's shaft is sunk 5 fms. below the 40 fm. level. The lode in the 40 fm. level, north of this shaft, is 1 ft. wide, and will produce 6 cwt. of lead per fm.; in the same level south it is 1½ ft. wide, very kindly, composed of can and good stones of lead; the stopes in the back of this level north are looking very well, producing 15 cwt. of lead per fm. The lode in the 30 fm. level, south of the shaft, is 5 ft. wide, and will produce 12 cwt. of lead per fm.; the stopes in the back of this level are also looking very well, producing 15 cwt. of lead per fm.; the winze under this level north is holed to the 40 fm. level. The lode in the

15 fm. level, south of the shaft, is small, but we are daily expecting an improvement, as there is a very large lode in the level below, which is extended 10 fathoms further south. Our parcel of ore, computed 34 tons, was sold this day to Messrs. Robert Mitchell and Son, at 17¢ 18s. 6d. per ton.

**WHEAL BENNY.—**Capt. J. Tabb (March 7) reports.—I beg to hand you a sketch of the south cross-cut, with the branches intersected previous to our cutting the main lode; the main lode is 4½ ft. in width, of a highly promising character, in a conglutinate strata of killas, and will leave us, as we extend eastwards, about 70 fms. back; these branches, or feeders, varying in size from 15 to 4 in., and running from 30 to 35 and 40° south of east, underlying south, will fall into the main lode eastwards, as marked on the sketch, the distances can be ascertained by the scale. In taking the branches and feeders, in connection with the main lode, I consider this to be a good speculation, and one of great promise; the cross-cut has hitherto been driven for 57 and 57. 10s. per fm., and is now driving for 31 per fm.

**WHEAL SARAE.—**Captain J. Spargo (March 5) reports.—Our dressing process is getting satisfactory, and we shall soon have several tons ready for market. The tribute pitches are looking just as last reported on; but there has been little done, as we have been fixing pitwork, &c.; the south end is looking just as last reported—very good.

**WHEAL VINCENT.—**Capt. J. Spargo (March 6) reports.—There is no material alteration in the south lode since last reported; the ground still continues favourable for driving. Our engine lode are completed to take the ladders; we shall commence next week in fixing our rods, rods, &c. Our wheel pit is down so far we can go for water, until our lobby is completed to take the rods, and we are driving by two paces, so as to lode to each other. We have met with a hard bar of ground in driving, but have again got through it; however, one pair of men have driven 15 fms. in about 15 days; the other pair before them have made but little progress, being in a hard rock, but are getting through it.

**WHEAL TRELAWNY.—**Capt. J. Bryant (March 6) reports.—Phillips's shaft is sunk 9 ft. under the 72 fm. level, where the ground is favourable; the men are now engaged cutting ground for bearers and cisterns; the lode in the 72 fm. level north is 3 ft. wide, composed principally of can, with spar, mica, and lead, worth 6¢ per fm.; the south end, in this level, is worth 10¢ per fm.; the lode in the rise in the back of this level is worth 5¢ per fm. The lode in the 62 fm. level north is still large, and worth about 20¢ per fm.; the lode in the south end, in this level, is 2 ft. wide, and worth 10¢ per fm.; the lode in the back of this level is yielding a fair quantity of ore; the lode in the winze sinking under this level, is near the same as last reported, worth 8¢ per fm.; the ground in Trelawny's shaft is not so hard as it has been. The lode in the 52, north of this shaft, is 3 ft. wide, and worth 10¢ per fm.; the stopes in the back of this level, and in the 42, are still producing a fair quantity of ore. The tribute pitches are, on the whole, turning out tolerably well. At the north mine, the lode in the 30 end, north of Smith's shaft, is 1 ft. wide, and worth 4¢ per fm.; this level is extended 14 fms. into Mr. Carther's land.

## FOREIGN MINES.

ANGLO-MEXICAN MINES.—Guanajuato, Jan. 5.—Anuncio:—

Week ending—	Memoria.	Sale.	Profit.	Loss.
Dec. 2	\$261 3 6	\$401 3 0	.....	\$140 0 0
" 9	221 0 0	516 6 0	37 3 0	.....
" 16	221 3 6	513 0 0	.....	34 5 6
" 23	221 3 6	513 0 0	.....	34 5 6
" 30	221 3 6	513 0 0	71 0 0	.....
Total loss on the five weeks, \$26 4 3.				

On the 3d of this month I surrendered the mine of Asuncion to the owners; and this is the last account the directors will ever receive of the "productos" of the said mine. I enclose copy of a document, handed to me by our lawyer, respecting certain debts which he has recovered for us, showing an amount of \$5992 6 1, of which I have received \$4096 6, and the balance, \$1896 0 1, will, I expect, be paid before this month is out.

**BOLANOS MINES.—**Extract from a Letter from Mr. Birbeck, dated Jan. 2. I have the honour to acknowledge the receipt of your favour of 27th October, and beg your reference to my respects of 4th December.

**CELESTINA.—**I regret that I cannot advise of any decided improvement in this mine. The south end of San Juan yields a little more ore, and the halvans assist us with a few. The south end of fair quality, and the produce is accumulating in the Granja until there be sufficient to make it worth while to bring the mules from pasture for the purpose of grinding.

**Mine Captain's Report, dated Mineral del Bote, Jan. 4.**

In Taylor's cross-cut, 15 varas have been driven during the month, and there was no alteration in the ground until the 28th Dec., when we struck a small vein of hard barren quartz, about 1 vara wide; and, since the above date, the ground has become much harder. We have also cut a little water, but as yet not of much consequence. In the cross-cut, De la Compañia, 5 varas have been driven during the month, and, on the 17th Dec., we reached the south wall of the Pozo de Guila, and which at once drained the water from the pozo, and eventually sent us out of the cross-cut for a few days, until the communication was properly made from the pozo, so as to enable us to place the pumps at the bottom of the cross-cut; this being effected, we again set to work at the water, and lowered it nearly to the bottom of the cross-cut. The pumps have since been taken out, the four whims being sufficient to keep the coming stream; and the driving in the cross-cut is being continued, but the vein in this particular point appears to be much disordered and very poor. In the western end, we drove about 4 varas upon it, when it again failed, and we have since opened a winze upon the same, which seems to continue down, and which is at present giving some very good ore, coated with native silver. In plan No. 1 east, the portion of the vein worked is about 3 varas wide, which, although in a decomposed state, has small cinnas full of native silver. In No. 2 east, the workings are also about 3 varas wide, and the vein has much improved within the last few days, and is at present in tolerably good ore. In No. 3 east, the workings are nearly 5 varas wide, but the vein is disordered, and very poor. In No. 4 east, the workings are also about 5 varas wide, and the vein is much improved, and we have since opened a winze upon the north, to examine this portion of the vein, which is unexplored, and also a winze in the bottom of the plan, to prove the vein further in depth. There is no doubt, as I before said, that the vein is undergoing, at the present depth, a great change; but looking at the fact, as stated above, of some of the planes, but a few weeks since so poor, having within the last two days again given some specimens of the most splendid ore I ever recollect to have seen from this mine, I have little doubt that this poor body of ground is nearly at an end, and that ores of higher ley than we have yet met will be found at greater depth; and, although the end of the Compañia cross-cut is now 1 see, this is a statement of the opinion of the mine, which is of opinion as I am, that even about 5 varas wide, and which 4 varas is a horse, running nearly in the centre of the plan, and which has greatly disordered the vein, leaving, towards the south wall, a branch about 1 vara wide, which is very poor, and to the north, a vein of about 3 varas wide, which assays about 3 marcos per monzon; but as the expenses in ponies must be very great, in carrying ores from this point to San Genaro shaft, it has been suspended until a cheaper mode of extracting these poor ores can be procured. In plan No. 3 west, we met with an old vein of very good ore in the western end, and drove about 4 varas upon it, when it again failed, and we have since opened a winze upon the same, which seems to continue down, and which is at present giving some very good ore, coated with native silver. In plan No. 1 east, the portion of the vein worked is about 3 varas wide, which, although in a decomposed state, has small cinnas full of native silver. In No. 2 east, the workings are also about 3 varas wide, and the vein has much improved within the last few days, and is at present in tolerably good ore. In No. 3 east, the workings are nearly 5 varas wide, but the vein is disordered, and very poor. In No. 4 east, the workings are also about 5 varas wide, and the vein is much improved, and we have since opened a winze upon the north, to examine this portion of the vein, which is unexplored, and also a winze in the bottom of the plan, to prove the vein further in depth. 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erect smelting works to return their ores—and that the negotiations consequent on this, led to the very liberal arrangement now proposed, by which they guarantee the repayment of the 12,000l. now sought, with 6 per cent. interest and also give, as a bonus, to the subscribers of that fund the proportions indicated in the several shares in the whole concession, and profits of the mines and minerals raised, thereby abandoning to such subscribers one-fifth of the mine. Besides exhausting their purses, there were existing demands on the mine at the time of my visit. The sums already paid in by Messrs. Blanch, Hooker, and others, have relieved the concessionaire from liabilities on this score; but they have still no smelting works.

Of the Cost-book System much remains yet to be learnt. There cannot be much variance in the entrance of mining cost; it facilitates the transfer of shares, and enables shareholders to discontinue liabilities. Without attempting to define what the "Cost-book System," or the "Cost-book Principle" may be, it suffices to insert the words—to take the company out of the expensive, tedious, and inquisitorial operations of the Joint-Stock Companies' Act. The "simple" question you ask—"from whence the 6 per cent. upon every 100l. subscribed is to be obtained?" may be as "simply" answered, by saying that the repayment of the principal advanced as well as the interest, is guaranteed by the ores already extracted, which are worth more than double the amount sought. To revert, in conclusion, to the question of credibility on which the whole matter hinges, that must be left to actual experience. Let those who doubt send their own mining, or other agent, to examine the mines, and ascertain if the advantages held out in the prospectus are based on sound views, and if the property is really of the value it is represented to be. Let the true position of the concern be fully investigated, and I confidently rely that all cavelling at the prospectus and the undertaking will cease, seeing that a mine, brought forward under such extraordinary circumstances, must necessarily have elicited an "extraordinary prospectus," and I feel assured that what indomitable perseverance has discovered and proved, will not fail of capital for development.—J. G. BECKERLEG: London, March 8.

**BALLESWIDEN.**—A general meeting of adventurers was held at the mine on Tuesday, the 28th Feb.—R. N. DAVY, Esq., in the chair.—The accounts, for Nov. and Dec., were presented—showing a balance of 1096l. 15s. 3d. in favour of adventurers, and a dividend of 10s. per share, amounting to 812l. was declared.—By tin unsold, 4872l.; ditto sundries, 17l. 18s. 7d.—4889l. 18s. 7d.—Wages, 2433l.; coals, 2057l. 11s. 11d.; carriage, 85l. 13s. 6d.; merchants' bills and dues, 1055l. 13s. 11d.; rents, 33l. 5s.; leaving balance in favour of 1096l. 15s. 3d.—By dividends of 10s. per share, 812l.; profit and loss account, 284l. 15s. 3d.

**BUDNICK CONSOL.**—A meeting of adventurers took place at the mine on Monday last, when the accounts, of which the following is an abstract, were examined and allowed:—To balance from Oct. last, 223l. 11s. 9d.; costs, &c., for Nov., Dec., and Jan., 1374l. 11s. 7d.—1598l. 3s. 4d.—By ores sold (less dues), 1354l. 6s.; carriage of tin, 20l. 17s. 4d.; sundries, 9s. 6d.—1375l. 12s. 10d.—Balance against adventurers, 222l. 10s. 6d.

**CARADON WHEAL HOOPER.**—At a meeting of adventurers, held at the Black Horse Inn, Exeter, on the 5th inst., the accounts were examined and passed, showing—Amount received on calls, 306l. 15s.; by balance from last account, 26l. 19s. 2d.—Labour cost Nov., 104l. 17s. 1d.; ditto Dec., 156l. 10s. 7d.—Leaving balance in favour of adventurers, 18l. 8s. 2d.; to this is to be added unpaid calls, less loss by forfeiture of shares (32l. 5s.), 376l. 5s.—394l. 13s. 2d., which, deducted from amount of unpaid bills, leaves balance against the mine, 50l. 7s. A call of 30s. was made, and it was resolved, that the pursuer give notice to all in arrears, that provided their calls were not paid in 10 days, the solicitor was to proceed against them without further notice. A report from Messrs. Seymour and Collom was read, which stated that the lode in the eastern part of the mine, below the 50 ft. level, was 1 ft. 3 in. wide—a regular and compact lode, very kindly, composed of spar and pebble, with some good yellow copper ore, not sufficient to pay, but promising; in the cross-cut they intersected many pretty branches underlying south to meet the lode. In the 50 ft. level east, on Daw's lode, it appeared at times as though they were about to cut into a course of copper at once, and again the lode disappeared altogether, leaving a small vein with regular walls, letting out a stream of water, and they thought a large lode would be met with at the junction of the two lodes. The 58 west, on Daw's lode, was looking very promising, the lode forming itself into a regular body as they proceeded towards the junction of the two channels of granite, composed of pebble, spar, and mudstone, with good spots of copper. Carpenter's lode is found to be the counter lode which came through Daw's lode, underlying north more than was expected; this is a very kindly lode, and a winze ought to be sunk on it near the shaft, to develop it.

**HIGHSTON DOWNS.**—At a general meeting of adventurers, held at the offices, 50, Threadneedle-street, on the 5th inst., the accounts were examined and passed, from which it appeared, that the labour cost for Dec. was 100l. 2s. 7d.; for January, 159l. 4s. 11s.; and that there remained a balance in favour of the mine of 17l. 13s. 4d. The liabilities to be discharged for February and March accounts were estimated at 282l., and it was computed that 20 tons of tin will be ready for sale by the 25th March.—It was resolved, that a call of 3s. per share be made payable on or before the 26th inst.; that Messrs. W. A. Thomas, J. Ashwell, and G. K. Huxley, be a committee of management; that Mr. J. H. Hitchens be general superintendent at the mine, his exclusive remuneration to be 2½ per cent. on the dividend profits of the company; that Mr. W. E. Commins be paymaster and accountant, at a salary of 5l. per month; that the banking account be removed from the London Joint-Stock Bank to Messrs. Masterman and Co.; that an assignment of the lease of the set be obtained from Messrs. Richards, Chippendale, and Harrison, and that Messrs. Cooke, Browne, and Co., of Bedford-row, be requested to attend thereto.—A new code of rules and regulations were adopted, and a report was read from Mr. J. H. Hitchens, which stated that the progressive results were highly satisfactory, the steam-engine and all the requisite surface machinery had been placed in a fully effective state and condition, and found to work exceedingly well; the required pitwork had been properly fixed in the engine-shaft; the water forked, and kept under complete control; dressing-floors, calcining-houses, and other surface buildings completed, and all the arrangements accomplished for returning the ore to market. The 35 ft. level east is driven 6 ft., and satisfactory, the lode being 4 feet wide, with tin, worth 14l. per fm. The 30 ft. level west is driven 6 fms.; the lode is upwards of 4 ft. wide, also producing tin, to the amount of 14l. per fathom. The tribute ground in active operation was a pitch in back of the 20 east, by four men, at 10s. in 1l.; two in bottom of ditto, by four men in each, at 8s.; one in back of 20 west, by four men, at 7s. 6d.; two in the bottom of ditto, by two men, at 7s. 6d.; and another, by six men, at 4s.—a low price, but remunerative. The general results exceeded the most sanguine expectations.

**LWYNS MALES.**—The two-monthly general meeting of shareholders took place on Tuesday, the 5th inst., at the office of the company, Copthall-court—Major MONCK COOPER in the chair.—Capt. Henry Francis's report having been read, and satisfactorily approved of (vide Mining Correspondence), it was considered that the prospects of the mine were now arrived at no flourishing condition that a steam-engine should at once be erected—a proposition emanating from the chair. But, on the matter being fully considered, it appeared that the present pumping power by water-wheel was sufficient to carry the mine to a further depth of 15 or 20 fms., and thereby opening a great quantity of valuable ore ground to view, it would be unnecessary to employ an engine at present; but reconsider the matter that day six months, which was adopted; and the meeting separated, after the usual business, much satisfied.

**SOUTH WHEAL FRANCES.**—At a two-monthly meeting of adventurers, held at the mine, on the 5th inst., the accounts were submitted, showing—Balance last account, 693l. 7s. 6d.; copper ore sold Dec. 7, 1044l. 4s. 7d.; ditto Jan. 4, 942l. 2s. 7d.; tin sold Dec. 2, 464l. 18s. 2d.; ditto January 31, 586l. 3s. 4d.—3782l. 2s. 2d.—By labour cost Dec., 629l. 10s. 8d.; ditto Jan., 521l. 17s. 9d.; merchants' bills, 621l. 14s. 7d.; lords' dues, 202l. 11s. 6d.; property tax, 72l. 18s. 4d.—leaving balance in favour of adventurers, 1083l. 9s. 4d., from which deduct dividend, 8l. per share, leaves balance to next account, 691l. 9s. 4d.

**SPRANE CONSOL.**—At a meeting of adventurers, held at Baleswidon, on Tuesday, the 28th Feb., a statement of accounts, for Nov. and Dec., was produced, showing—Balance in favour of adventurers at last account, 42l. 18s.; amount of tin ore sold up to this day, but raised previously to the middle of January (21 tons 13 cwt. 3 qrs. 24 lbs. sold; highest price, 56l. per ton), 1141l. 4s. 6d.—1184l. 2s. 6d.—By labour cost, including carriage, 616l. 8s.; coals (83 tons 12 cwt.), 50l. 9s. 6d.; materials, 137l. 17s. 10s.; stamps, rent, &c., 107l. 11s. 6d.; leaving balance in favour of adventurers 370l. 15s. 8d.—A dividend of 2l. 5s. per each share was made—leaving balance to be carried to next account in favour of adventurers of 82l. 15s. 8d.—[The adventurers were congratulated on having received from this mine in dividends 20l. per share on an expenditure of only 10l. per share, with the further satisfaction of the prospects of the future being most encouraging.]

**WHEAL ANNA MARIA.**—A meeting of adventurers in this mine—the most easterly in Cornwall or Devon—took place at the mine, Dunsford, near Exeter, on Wednesday last, the 7th inst.—Capt. FULFORD, R.A., in the chair—when it was resolved, that a call of 10s. per share be made payable within 14 days, and that from the favourable appearances of the mine the captain be requested to carry on the operations with all vigour. The following report from Capt. James, the agent, was read:—"Our operations have been principally confined to the sinking of the engine-shaft, which is down 12 fms. 2 ft., and the ground very favourable, being in a good killas, intermixed with branches of spar, prill, mudstone, &c., of very favourable appearance; and I expect to intersect one of the south lodes in the engine-shaft in about 3 fms. sinking, which will be 15 or 16 fms. from surface; and from the appearance of the lode in Wheal Lawrence shaft, now about 5 fms. deep, and about 30 fms. from our shaft, we may expect good results even at that depth; and from the nature of the ground, which improves in sinking, it is my firm opinion that those stray lodes on the backs must turn out productive in depth."

**WHEAL COMFORT.**—A meeting of adventurers in this mine was held at Wheal Buller account-house, on the 2nd inst., when the accounts, of which the following is an abstract, were submitted and allowed, and a dividend of 2l. 10s. per share was declared:—By balance from last account, 91l. 3s. 2d.; ores sold to Dec. 31 (less dues), 2045l. 0s. 5d.—2136l. 3s. 7d.—To costs and merchants' bills to January 31, 1514l. 12s. 1d.; dividend of 2l. 10s. per share, 320l.—1834l. 12s. 1d.—Balance in favour of adventurers, 301l. 11s. 6d.

#### MINING NOTABILIA.

[EXTRACTS FROM OUR CORRESPONDENCE.]

**EAST SHEPHERD.**—This mine is situated in the parish of St. Enoder, and is within about half a mile of the sett of East Wheal Rose; it has been favourably reported upon by Capt. Middleton, of East Wheal Rose, and Capt. Evans, both men of known experience and judgment. It is taken up by a very spirited company in Manchester, and its business conducted at the offices of Messrs. Kenworthy and Jones, 51, King-street, the former of whom takes the arduous duties of honorary secretary, and the latter those of purser of the company. The whole of the shares in this mine were immediately taken up on the completion of the preliminary arrangements. There are already drivings in the adit level, extending over upwards of 350 fms., in which have been laid open eight promising lodes of silver-lead and copper ores, &c.; and, from the congenial nature of the ground, and the indications already exhibited, there can be no doubt of this mine proving a considerable source of wealth, with a small comparative outlay. An excellent engine, of 31-inch cylinder, has been erected, and is now in full operation in draining the mine, which will be equal to the requirements of the mine down to the 70 ft. level. The engine-shaft is now in course of sinking, and is proceeding at the rate of nearly 2 fms. per week; it is down to 10 fms. below adit, and the 20 ft. is expected to be reached before the end of April, when the first lode will be cut at both the 10 ft. and 20 ft. level. The locality of this mine, its proximity to East Wheal Rose, its congenial strata, and indications, are each and all earnest of its success, and we heartily wish its promoters all prosperity.

**OLD TRELEATHER MINE.**—In the neighbourhood of Padstow (North Cornwall) is situated the celebrated Old Treleather Mine, and for which set upwards of 200 applications, at different times, have been made for a grant to work the important discovery there found, the whole of which have been refused by the present proprietor of the soil. At last, through the energy and perseverance of Captain Verran, it has been discovered that the minerals belong to Lord Arundel, whose ancestors were formerly proprietors of the lands and manors in that neighbourhood, which were disposed of by them, subject to a reservation of minerals. We are glad to hear that some important negotiations are taking place, which we trust will shortly bring this mine before the public. A gentleman of London sometime since purchased the adjoining estate at a large premium, it being found that the lode in question runs through the ground.

**MARAZON.**—On Tuesday last, a fine course of copper was cut at Wheal Wellington Mine, upwards of 2½ ft. in size; and, although the copper from this mine has been chiefly of high produce, this exceeds all by far that has yet been discovered; it is supposed to be worth upwards of 100l. per fm. It is in the 22 ft. level going east, and it is sincerely wished that this course of copper may continue and increase, and that this mine, being the only one now at work in the neighbourhood, may have an enduring course of prosperity.

[From the Plymouth Journal.]

**WHEAL FRISCO.**—The end in the 47 ft. level is still poor, but in a winze which is being sunk from the 32 to the 47 ft. level, about 10 fms. to the east of the 47 ft. end, there is a lode worth from 15l. to 20l. per fm. The 62 ft. level end is producing some good stones of ore, but here too, in a winze sinking below the 47 ft. level, 20 fms. ahead of the 62 ft. level, there is a good lode. The sampling for this month will be about 105 tons, which will give about 100l. profit on the month's working.

**WHEAL ASH.**—In the leader of peach and soft spar, spoken of in our two last reports, and which is widening, there is a little ore coming in. The mudstone in the shaft continues.

**PLYMOUTH WHEAL YEOLAND.**—In the diagonal shaft, which has been sunk about 3½ fms., a large stream of water has been cut. The lode above the adit in the 32 has not been cut. In the new south lode nothing has been done since our last.

**PLYMOUTH WHEAL YEOLAND EAST.**—At the meeting held on Friday last, it was resolved that flat-roads should be attached to the Plymouth Wheal Yeoland engine, and a shaft sunk on the main lode to a 12 ft. level, and the levels extended east and west. Capt. Edwards stated that this lode, an adit on which had been cleared for 250 fms. for the last 30 of which the whole of the lode above the adit had been carried off; he further stated that he considered this the most promising lode which he had seen in the district.

**WHEAL ANDERTON.**—The lode in the 90 has not been fully cut through.

**EAST CROWSDALE.**—The Rix-Hill lode has improved since our last. The end is now worth 45l., and in the backs 50l. per fathom.

**BIRCH TOR AND VITIFER MINES.**—The lode in Priderox shaft, in the Birch Tor lode, continues to hold down, and is a good lode—the ground is rather hard. In the lode in Dunstan's, in the Old Vitifer lode, the shaft is improved considerably—the ground is good and stands without timbering. It is expected that the winze from the deep to the shallow adit will be held very shortly, after which we shall soon see the lode in the deep adit under the course of ore in the shallow adit.

**CARADON WHEAL HOOPER.**—A general meeting of the adventurers of this mine was held at Exeter on Monday last, when the reports presented to them were most satisfactory, decided improvements having taken place in the different parts of the mine at which operations are being carried on. The end driving south, in the 58 ft. level, is very wet, and is draining away from Pearce's lode (a large gossan lode), which this level is driving to intersect. The progress here is at the rate of 2 fms. per week, in a promising-looking killas. The 58 west, on Daw's lode, has nearly approached the point where the two channels of granite meet. The saw-pit lode is about 1½ ft. thick, containing good stones of copper ore, and it is expected will soon get bigger as the branches to the north again unite with the lode.

**WHEAL CALISTOCK.**—The men engaged in clearing the old men's workings at the deep adit level, have succeeded in getting into the eastern end. The ground has been beaten away both above and below this level. Fine stones of copper ore and fluor-spar have been found in the old workings, and the length of ground opened on, in which ore has been found by the present company, and the old miners, is from 70 to 80 fms. In the old workings one of the old men's pumps was found—it is a tree bored, about 5 in. in diameter within, bound round with iron. Nothing new in the pitch or other parts of the mine.

**BITUMINOUS SHALE COMPANY.**—On the Dorsetshire coast has been discovered extensive deposits of bituminous shist, a combination of animal and vegetable matters, united by a cement containing as its base silicate of ammonia. This substance, on analysis, has been found to contain a pure volatile oil or spirit, perfectly colourless and transparent, and admirably adapted for lamps; a more dense oil having no tendency to become rancid, and burning with purity in ordinary lamps; a fatty odorous oil, adapted for lubrication; paraffine, or spermaceti, in large quantities; a grease peculiarly adapted for locomotive engines; and the carbonaceous residuum is a powerful disinfectant, and makes a fine manure. The lands containing these valuable productions have been taken by the present holders, and secured by a private Act of Parliament, and it is proposed to establish a company with a capital of 25,000l., in 500 shares, of 50l. each, 20l. to be paid down, which will enable the directors to establish the necessary works, and make good the expenses already incurred. No further call is to be made of more than 10l., and that at a special meeting of the shareholders. From careful estimates made, and which have been borne out by practical results, the raising of only 15 tons per day of shale will produce 32,565l. per annum; and, deducting working expenses, and 10 per cent. for casualties, leaves nearly 20,000l. profit on the capital paid up. A respectable directory is formed, and, on the appropriation of all the shares, the company is in a position immediately to commence operations.

**LONDONDERRY MINING COMPANY OF NOVA SCOTIA.**—We have received a communication from Mr. Ross, of Nova Scotia, the promoter of this company, in which he complains of the remarks from correspondents in the local press, in attempting to lower the enterprise in the opinion of the public, and prevent its ultimate success. After comparing the cost of the production of iron in England, Scotland, and the United States, Mr. Ross says, "the Londonderry Mining Company can obtain good split coal on their own property for the price of digging, which ought not to exceed 4s. per chaldron at most. They pay no royalty or lordship—and 1d. per ton on iron ore, not stones, as stated by some correspondent, that can be obtained without the use of an engine, or even a pump, would pay the price which the whole property cost the company. The ores require no calcining, and the cost of delivery at the furnace will not exceed 3s. per ton, and yield 70 per cent. of pig iron; yet we are told by a New York correspondent, that pig iron cannot be manufactured in Nova Scotia for less than \$144 per ton." Allowing a ton of pig iron to require 2 tons 7 cwt. of mineral coal, the saving in this article alone, in favour of Nova Scotia, as compared with Pennsylvania, would amount to 33s. 3d. per ton, supposing the price is only estimated at 20s. per ton for American, and 4s. per ton for that of Nova Scotia, or 8312l. on 500 tons.

**A MAN ENTOMBED EIGHTY FATHOMS DEEP.**—An unfortunate man, named Johnson Jeffries, who was mentioned a fortnight ago as having been buried in an iron-ore pit on Lindale Moor, Cumberland, is still underground, and it is said there is not the least probability of his body being recovered in less than six months, even with full sets of men working day and night. The corpse lies about 80 fms. deep, covered with many tons of earth and water.—Durham Adc.

**IRISH RAILWAYS.**—A meeting of Members of Parliament interested in Irish railways, was held on Thursday, in one of the committee-rooms of the House of Commons, for the purpose of considering the necessity and advantages of Government aid being afforded to the Irish railway companies. After some discussion it was agreed that the chairman, Sir Lucius O'Brien, should apply to Lord John Russell, for the purpose of obtaining his assent to the introduction of such a measure as would enable the Government to assist with loans those railway companies who are legally entitled to borrow money, with a view to enable them to complete their works, and likewise bring their railways into profitable operation.

**OPENING OF THE SOUTH STAFFORDSHIRE RAILWAY FROM WALBAIL TO LICHFIELD.**—The Government Inspector has been over this important section of the South Staffordshire line, and pronounced it in good working order. It is about 17 miles, and unites with the Birmingham and Derby, passing through Lichfield

#### THE ELECTRIC TELEGRAPH.

(Specification of patent granted to John Lewis Ricardo, Esq., M.P., Lowndes-square, Middlesex, for improvements in electric telegraphs, and in apparatus connected therewith—*Mechanics Magazine*.)

These improvements refer—1. To a mode of insulating wires used for electro-telegraphic purposes; and, 2. To an apparatus for suspending them. The wires are led, from a reel, between a pair of rollers, heated by steam or hot water, which are furnished with grooves on their peripheries, exceeding by two the number of wires to be insulated. The rollers are placed at such a distance apart as that the edges of the grooves shall not come into contact. Two fillets of gutta percha, or of any compound containing that material, are passed between the rollers, above and below the range of wires, whereby they are pressed closely together, so as to insulate the wires from external substances. The wires are caused to pass through the centre of each groove, and the portions of the fillets between each wire are pressed together by the edges of the grooves, so as to insulate the wires from each other. The surfaces of the fillets, intended to be brought into contact, are rendered adhesive by being made to pass over heated metal surfaces previous to their entry between the rollers. The under fillet may be supported in any suitable manner to prevent it from breaking or stretching after being heated.

The apparatus for supporting the wires is composed of earthenware, or any other non-conducting substance, having a hollow centre, closed at top by cement, in which the hook is suspended, so as not to touch the sides of the apparatus. A "throat" is constructed on the under surface of the apparatus, which has the effect of preventing the passage of water from the exterior surface to the hollow centre of the apparatus.

Claims.—The mode of combining two or more wires used for electric telegraph purposes with gutta percha, or any compound containing that material, so as to insulate one wire from the other, or others, and from external substances. 2. The apparatus for suspending wire used for electric telegraph purposes.

**ALLEGED DISCOVERY IN VOLTAIC ELECTRICITY.**—Mr. Alfred Smee, the surgeon to the Bank of England, and the inventor of the battery which bears his name, has announced important discoveries in animal electricity. By a test, which he terms electro-voltaic, he has satisfied himself that the terminations of the sensor nerves are positive poles of a voltaic circuit, whilst the muscular substance is the negative pole. The sensor nerves are the telegraphs which carry the sensation to the brain, and the motor nerves carry back the volition to the muscles. The brain he infers to consist of five distinct voltaic circles, which, upon theoretical grounds, he believes to be sufficient to account for all mental phenomena. Mr. Smee has succeeded in making artificial electric fish, and artificial muscular substance. The bare announcement of such a discovery must put the whole medical world upon the alert, and in their hands, for the present, we leave it. Should Mr. Smee's views be confirmed by other investigators, he will establish an imperishable name in the records of physiological science.

**REDUCTION OF SULPHATE OF LEAD INTO METALLIC LEAD.**—In calico printing works a large quantity of sulphate of lead is produced in the preparation of alumina by the decomposition of acetate of lead by alum; this substance was for a considerable time thrown away, as no use could be found for it. It has, however, been discovered that metallic lead may be obtained from it, by reducing it by means of zinc or iron. This reduction is found to be attended with great difficulty if a pure salt be employed; but according to MM. Trommsdorff and Herman, reaction is readily produced under the influence of certain salts, and amongst others of common salt. The method of proceeding is as follows:—100 parts of sulphate of lead are mixed with 10 parts of common salt and water, so as to form a thin paste, and lumps or sheets of metallic zinc are placed therein, or are covered with a layer of the saline mixture to a depth of from half an inch to an inch. The white mass soon changes into a grey matter, which is metallic lead, impregnated with sulphate of zinc and common salt; and by washing and melting very pure lead is obtained. Or it may be well washed without melting, and employed in that state for the preparation of ceruse or acetate of lead. It will be found that the porous and comminute state of the lead thus obtained by reduction renders it very apt to oxidize by contact with the atmosphere, even without the aid of heat. Exposed to the simultaneous action of a little acetate of lead, and an atmosphere rich in carbonic acid, it is with great facility converted into very white ceruse. In the white-lead manufactures, where the Dutch method is in use, plates of porous lead (prepared simply by subjecting to rather strong compression the lead obtained, in the state of fine powder, by the reduction of the sulphate of lead by means of zinc) may be employed instead of thin sheets of lead, rolled in a spiral form.

The trans-Atlantic steamer, *Acadia*, having been purchased by the Belgian Government, sailed from Liverpool yesterday for Antwerp, under the command of Captain Jackson.

**RAILWAY SAFETY SIGNAL TELEGRAPH.**—Mr. Brotherton, of Preston, has recently patented an invention for the prevention of accidents on railways. It consists, according to a description given of it in the *Preston Guardian*, of an electric apparatus fixed beneath the rails, on which the wheels of the train act as they pass over it. A wire connects this apparatus with any station, or junction, which the train may be approaching, and at which an electric alarm is fixed. By this invention the attendants at any station, or junction, may, it is said, be apprised of the approach of a train any number of miles off, and in case any obstruction exists, a signal can be immediately forwarded to the train.

**COLLIERY EXPLOSIONS.**—In the House of Commons last night, Mr. Cayley asked the right hon. baronet, the Secretary of State for the Home Department, whether Government had received any report of the colliery explosion near Wolverhampton, and whether it was the intention of Government to take any steps for preventing such dreadful occurrences?—Sir G. Grey said, he had received no official information on the subject of the accident to which the hon. gentleman alluded, but he had received a report of the coroner's inquest on the sufferers from the explosion near to Barnsley, and that report was now under the consideration of the Home Office.—Mr. Cayley said, he observed the hon. Member for Montrose had a motion on the paper relative to this subject, and he should be glad to know if the hon. gentleman intended to persevere in that?—Mr. Hume replied in the affirmative; and stated that he should bring it forward on the supply night.

#### RAILWAY TRAFFIC RETURNS.

Name of Railway.	Lgh. lthwy.	Present actual cost.	Price per share.	Div. 1848.	Div. 1849.	Div. 1848.
Belfast and Ballymena.....	37½	—	30	5 p.c.	£ 403	—
Birkenhead, Lancashire, & Chesh. B.	19	997,284	37	5 p.c.	837	715
Bolton, Blackburn, & West Yorksh.	14	—	61	—	361	—
Caledonian.....	141	3,993,732	238 ½	4	4489	2654
Chester and Holyhead.....	84	3,014,692	192 ½	4	—	—
Dublin and Drogheda.....	35½	774,875	33½	—	718	658
Dublin and Kingstown.....	7½	289,915	—	—	908	829
Dundee, Perth, & Aberdeen Junction.	47½	844,354	25	8	944	730
East Anglian (Lynn to Ely).....	67½	1,167,104	3	—	747	842
East Lancashire.....	44	1,733,915	10½	5	1973	956
Eastern Counties and Norfolk.....	307	10,364,505	10½	4	12378	12409
Eastern Union.....	51½	1,522,323	13	—	1123	1000
Edinburgh and Glasgow.....	57½	2,556,889	44	6	3246	3021
Edinburgh and Northern.....	78	1,724,214	11½	4	1756	661
Glasgow, Paisley, and Ayr.....	102½	2,286,533	12½	4	2268	1920
Gl. Northern & East Lancashire	22	845,325	11½	4	843	906
Gr. Southern & Western, Ireland	131	2,844,807	36½	7	3968	1815
Great Western.....	305½	11,608,815	98 7½	7	18049	15577
Kendal and Windermere.....	104	174,600	25	—	118	99
Lancaster and Carlisle.....	70	1,476,102	56 ½	4	1731	1463
Lancashire and Yorkshire.....	172½	8,242,628	72	6	11435	8676
London and North Western.....	435	26,077,942	183 ½	6	36480	36218
London and Blackwall.....	4	1,399,676	54 ½	1-19	453	636
London, Brighton, & South Coast	162½	6,284,812	36½	24	7014	5387
London and South Western.....	215	7,490,688	38½	6	8873	6301
Londonderry and Enniskillen.....	144	154,643	16	—	—	119
Manchester, Sheffield, & Lincolnsh.	91	4,651,093	41	5	2952	2034
Midland Company.....	471	14,042,340	82 1	6	19730	18139
Midland Great Western (Irish).....	50	725,332	18½	4	1158	928
North British.....	99	3,163,450	16 1½	5	2824	1731
Scottish Central.....	45½	1,246,496	29½	—	915	—
Strathburgh and Chester.....	47	780,274	19½	6	1292	521
South Devon.....	55½	1,789,351	17 ½	—	1582	644
South-Eastern.....	165½	7,389,322	25½	4	6091	5830
Taff Vale.....	38	820,056	45	—	1719	1838
Ulster.....	36	684,684	45½	—	692	586
West Cornwall.....	13	—	—	—	243	—
Whitehaven Junction.....	12	180,879	109 3	—	—	167
York, Brighton, & Berwick.....	269	5,038,255	25 ½	8	11228	9889
York and North Midland.....	259½	4,179,309	48½	8	6480	5600

#### FOREIGN RAILWAYS.



business has been done. About the middle of the month the price of mixed numbers

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## NOTICES TO CORRESPONDENTS.

"C. N." (Stoke-upon-Trent).—We cannot give you advice on such a difficult question. Our opinion is, that you should endeavour to have the affair settled by arbitration.

CUTTING FILES BY MACHINERY.—Sir, I observed in your Journal of Sept. 9, 1848, a notice of a machine for this purpose, which had been patented by Mr. G. Winslow, late of Barton Crescent. Can you, or any of your correspondents, inform me where this machine can be seen, and also if the patentee will furnish specimens of the cutting? Being a manufacturer of files, and paying union prices for work, it is interesting to me to know if the machine answers the object. I should not have troubled you with this communication if I could have traced out the patentee.—A SHEFFIELD MANUFACTURER.

"Climbers" (Wakefield).—There are large deposits of marble in Norway; they have been but partially worked, owing to their remote situations, and the difficulty of transport. Some, in the province of Bergen, has been declared, by the Scandinavian architects, to be equal to that of Carrara.

J. L. Tuxley (Tenby).—It is impossible to answer the question, there being no rule as to royalty in proportion to depth or amount. An agreement is made between lord and adventurer, on the latter taking a sett, which is binding during the period of the lease. On getting down to great depths, concessions are frequently made by owners of mineral ground, in consideration of the increased working expenditure to which the adventurer is subject. The number of engines is not a consideration.

John Jones (Dunfermline).—A good account of the manufacture of iron is to be found in Dr. Ure's Dictionary of Arts, Manufactures, &c. In the year 1840, Mr. David Mauchart published a series of valuable papers, which fully treat of smelting iron-ore, together with the component parts of the different varieties, as well as much useful general information on the subject. The cost of the work is 1s. 10s., and is to be had of Mr. John Woole, High Holborn. No later work on the subject has been published.

"C. C. G." (Southampton).—Steam-boats commenced plying on the Clyde in 1812. The first was seen on the Thames in 1815. A steamer arrived in Liverpool from New York in 1819; and in 1825 the first steam voyage was made to India.

"An Old Subscriber" (Isle of Man).—The new mineral, denominated "Diamondite," was discovered in the vicinity of Tebelok, in Siberia.

"Domesticus" (Mile End).—Silly as may appear the act of laying a poker across a fire-grate to revive a decaying fire, it involves a scientific principle, which in some measure is effective. The solid iron concentrates the heat of the passing smoke, and creates a draft through the fire; it also conducts the electricity from the upper portion of the coals, increasing that beneath, thereby creating flame. We apprehend when the poker becomes equally hot with the passing smoke the action ceases.

"M. G." (Norwich).—You can probably obtain the information you require at the office of the New Zealand Company, in Broad-street, City.

Mr. Pridemore (Plymouth).—We have forwarded your communication to "Chemical," who replies that, previous to receiving our letter, through the kindness of a friend, he obtained the work he required. He, at the same time, returns his thanks for the trouble you have taken in endeavouring to assist him.

"Copper" (Lewisham).—The smelting-works at Hamburg were commenced in the month of September, 1847. All the ores they have hitherto smelted have been from Chili. The furnaces are reverberatory, and worked solely on the English method. The present superintendent is Mr. Nielsen, a Norwegian, formerly of the Alten Works. The bricklayers are Germans, and there are but two Welshmen on the establishment.

"B. M." (Torquay).—The shipments of coal from the River Tyne in 1847, amounted to 3,239,444 tons.

"A Shareholder" (Darent).—The calls on railroad shares during last month amounted to 1,509,511, which was subdivided in the following manner:—English, 1,187,168; Scotch, 356,513; Irish, 31,250; foreign, 25,000.

"A Taxpayer" (Faversham).—The original estimate of the cost of building the new Houses of Parliament was 707,000. Since then, however, more than double the amount has been expended; what the ultimate cost will be is more than we can tell.

"J. H." (Cornhill).—In our Journal of the 20th May last, we published a paper on the extraction of sulphur from mud. It was accompanied with a sketch of the furnace employed to carry out the experiment.

"A Reader of your Journal" (Dudley) will oblige us by furnishing some particulars of the matter referred to.

R. C. Manuel (Woolwich).—The price of Rannaford Coombe Mine, was altered, in our broker's returns of last week, from 7s. to 2s. For this decline there must have been some marked cause, and we should recommend our c-respondent to apply in the London share market. We use the utmost caution and exertion to obtain correct prices, and must, in a great measure, depend on our authorised agents, whom we severally hold responsible for the information afforded. Under all such circumstances, we recommend consultation with respectable brokers.

"M. B. L." (Thames-street).—Newman's apparatus is, we believe, the best for the oxy-hydrogen blow-pipe. Two volumes of hydrogen to one of pure oxygen produce the greatest heat known; the great difficulty is to obtain supports, as nearly every hard and intractable substance is either fused, vaporized, or dispersed.

"A. M." (Temple).—The metals which retain heat the longest are brass and copper, then iron and tin, and lastly lead.

J. Edmunds (Derby).—Previous to the introduction of coke as fuel for smelting iron ores, the great iron smelting districts of England were Kent and Sussex, on account of the great quantity of wood they contained. The iron rolling round St. Paul's Cathedral was cast at Loughborough, in Kent.

F. Deacon (City).—The only copper mine in France is Chessy, near Lyons. It is but partially worked, the production was never of any great extent; its greatest celebrity was derived from the beautiful specimens of blue and green carbonates which were obtained from it. The furnaces used there are the half-high German furnaces; they are of a very high antiquated construction, and are now nearly everywhere exploded.

"Owen" (Newcastle-under-Lyme).—The carbonates of copper require to be treated in a different manner to the sulphates. The latter require repeated calcinations; while the former can be smelted in the raw state with the regulus produced from other ores.

"B. G." (Cambridge).—All the mines and manufactures of metals in Saxony, whether public or private, are subject to Government superintendence. The principal inspector, who ranks with a general officer, is styled the Ober Berg Hauptmann. Under him are various officials, of different grades, in the several departments of mining, smelting, and manufacturing;—these report quarterly to him the various occurrences which have passed in their districts. A condensation of this is embodied in the form of an annual report, and transmitted to the Minister of Finance, who is considered the supreme chief of this branch of national industry.

"G. Harris" (Salisbury).—The steel from which the famous Bilbao blades were manufactured, was produced from the iron of the mines of Castro and Zamora, in the province of Biscay. They obtained their cognomen from the port from whence they were shipped.

"A Miner" (Beecham).—Tin has been discovered, in the granite formation, in the province of Galicia, in Spain; the lodes are, however, not yet worked. A party of French gentlemen, in the year 1845, projected a company to explore them; but owing to the railway mania of that year, they were unsuccessful.

"A Railway Shareholder."—In reply to our correspondent's enquiries respecting Clarke and Varley's elastic atmospheric railway system, we can state, the model which worked for nearly two years at Blackwall, was perfectly free from leakage, and gave every indication, as far as the length in use would allow, of possessing the elements of complete success if carried out on a working scale. We have not heard lately if any progress is being made for the construction of a line.

"A Chemist" (Bath).—Sulphate of carbon, obtained from charcoal, has been used as a means of etherisation with great success in Norway. The discoverer was Harold Thaplow, an apothecary of Christiania.

"An Engineer" (Plymouth).—The broad gauge is 7 ft., the Irish gauge 5 ft. 3 in., and the narrow gauge 4 ft. 6 in. The first locomotive in 1824 travelled at a rate of 6 miles an hour; in 1829, the Rocket attained a speed of 15 miles per hour; in 1834, the speed of the Fire Fly was 20 miles per hour; in 1839, the North Star had progressed to 37 miles an hour; at this present time locomotives move with a velocity of 70 miles in an hour. Since the first introduction of railways, the quantity of fuel required for generating steam has been reduced five-sixths;—that is, one ton of coal is consumed now, where formerly six were necessary.

A correspondent ("A. B.") inquires, if Dr. Fyner succeeded in his attempts to revive the air in the diving bell two or three years since; and if so, whether it would be possible to restore to the air in the blast-furnaces, in the summer season, the same quantity of oxygen which exists in the winter; the difference causes a falling off in summer of 20 per cent. of the make of iron at the several works in the kingdom? We believe Dr. Fyner was completely successful in many of his experiments, but we have not heard of the invention since. We should not have believed there could have been such a difference in the make of iron, arising from the difference in the temperature of the atmosphere between summer and winter; perhaps some of our scientific correspondents in the iron manufacture will enlighten us.

GEN. COTTON.—Sir: I have read, in your last week's Journal, a letter on gun-cotton, by your scientific correspondent, Dr. Murray. I think a reference to your past papers will show that public attention was first directed to the danger of the use of gun-cotton for mining purposes by your occasional correspondent, "B. D." of Merthyr Tydvil.—A. R. I. C.: March 7.

"An Ironmaster" (Wolverhampton).—The projected Swedish railroad is to be from Orebro, a town of about 9000 inhabitants, to Ault—an inconsiderable place. Its distance will be about 51 miles, which passes through a district abounding with ironstone, which hitherto, on account of the expense and difficulty of carriage, has been but partially developed. It is to be a single line; the estimated cost is 270,000. All the Crown land through which it passes, as well as the wood, stone, and lime, necessary for construction, has been conceded to the company by the Government. The profits, according to the present returns of traffic, are calculated at 6 per cent.; the Government have guaranteed a minimum dividend of 4 per cent. on their capital to the shareholders. The company is formed under the patronage of the Crown Prince. Mr. Skogman, President of the Swedish Board of Trade, is the President; and Mr. Engstrom, the British Consul at Gottenburg, is one of the directors. It is further intended, should this line be successful, to continue it from Stockholm to Gottenburg—a distance of 400 miles—which will bring Stockholm and London within 70 or 80 hours of each other, instead of as at present 10 days being consumed on the route. Whether this will pay or not is extremely problematical, as, during the greatest part of the year, the Gotha Canal, which connects Stockholm and Gottenburg is open, and steamers enough for the traffic are plying between those two towns and the intermediate places. The ice in general lays in the Gotha Canal from the latter end of December to the middle of April; and it is only during this period that a lively traffic would take place on the railroad, which, at the same period, would be liable to all the difficulties of the climate—such as snow drifts, ice on the line, &c., while it would have to compete with the sledge traffic of the peasantry. This is not so inconsiderable as might be imagined, as when the roads are well frozen, and in good order, a single horse can draw above a ton weight. It is the intention of the company to endeavour to raise a portion of their capital in England; but we think at present they will find great difficulty in attaining their object.

"A. Z." (Hamstead).—It is a fact that Count Rumford, who devoted nearly his whole life to improvements in the economy of heat, left 1000l. Three per Cent. Consols, the interest to be disposed of every two years to persons who have made valuable discoveries in heat and light. We do not know who has the distribution of the funds, or whether it has ever been claimed.

"We should feel obliged to all pursers captains, or adventurers, to forward particulars of meetings, &c., of the mines with which they may be connected, on the earliest opportunity, that they may be published in the Journal.

"The numerous disappointments in procuring back Numbers during the past year induces us to suggest, that subscribers should be careful in filing, or otherwise preserving, their papers; and where extra copies are required, that they should be applied for as early as possible.

\* It is particularly requested that all communications may be addressed—

TO THE EDITOR,  
Mining Journal Office,  
26, FLEET-STREET, LONDON.

And Post-office orders made payable to Wm. Salmon Mansell, as acting for the proprietors.

# THE MINING JOURNAL

Railway and Commercial Gazette.

LONDON, MARCH 10, 1849.

The Mining Journal is published at about Eleven o'clock on Saturday morning, at the office, 26, Fleet-street, and can be obtained, before Twelve, of all news agents, at the Royal Exchange, and other parts of London.

We published in last week's MINING JOURNAL a comparative statement of the imports and exports of metals, for the years 1847 and 1848, from the returns made up by the Board of Trade. The following are the returns of the imports for the three years, 1846, 1847, and 1848, from the same source:—

	1846.	1847.	1848.
Copper ore.....Tons	51,524	41,491	50,148
Copper, unwrought.....Cwts.	9,531	10,265	10,255
Iron, in bars.....Tons	24,533	33,317	23,306
Steel, unwrought.....Cwts.	18,466	13,097	6,755
Lead, pig and sheet.....Tons	7,863	5,292	3,507
Spelter.....Tons	7,345	12,769	13,423
Tin, in blocks, ingots, &c.....Cwts.	20,306	22,307	6,738
Quicksilver.....Lbs.	1,840,593	2,042,857	1,862,663

The exports of foreign and colonial produce, for the same three years, were as follows:—

	1846.	1847.	1848.
Copper, unwrought.....Cwts.	6,279	6,043	3,726
Iron, in bars.....Tons	4,094	5,053	4,432
Steel, unwrought.....Cwts.	18,497	13,367	9,779
Lead, pig and sheet.....Tons	4,700	3,462	3,748
Spelter.....Tons	4,784	5,346	3,777
Tin.....Cwts.	21,038	11,471	8,941
Quicksilver.....Lbs.	1,597,519	1,518,164	495,650

The exports of British and Irish produce were as follows:—

	1846.	1847.	1848.
Coal and culm.....£	971,174	968,502	1,096,356
Earthenware.....Tons	793,166	834,357	713,881
Glass.....Tons	262,527	291,180	236,518
Hardware and cutlery.....Tons	2,180,587	2,341,286	1,858,593
Machinery.....Tons	1,117,470	1,263,016	805,554
Iron and steel.....Tons	4,178,026	5,265,779	4,747,009
Copper and brass.....Tons	1,568,187	1,541,868	1,272,675
Lead.....Tons	147,170	179,344	117,181
Tin (unwrought).....Tons	107,466	159,466	143,436
Plates.....Tons	639,223	462,889	530,061
	£11,555,006	£13,308,392	£11,525,274

From these returns it will be seen that, notwithstanding the remission of the duty on foreign copper ores in 1848, the imports, although exceeding those of the preceding year by 8657 tons, did not come up to the quantity imported in 1846 by 1476 tons; and that while there is a reduction in the exports of British and Irish produce of 1,783,181, as compared with 1847, or about 14 per cent., the decrease, as compared with 1846, is but 429,732, or 3 per cent. We trust the present increased demand for metals, the consequent rise in price, and the healthy state of the markets, promise continuous briskness in trade during the current year, and that our next returns will show a great increase on the past, and satisfactory indications for the future.

We last week arrived at the conclusion of M. LE MOIR's notice of his battery; our space will not admit of proceeding to-day with his description of the machinery for producing and sustaining the electric incandescence. Whatever may be the merit of the lamp, of which the inventor himself is very cautious in expressing an opinion, it would seem there is some ground for admitting that an advance has been made by M. LE MOIR in the construction of a battery capable of economically yielding intensity. We have been given to understand, that as soon as arrangements can be made for the manufacture of the elements, they will be accessible—so as to enable chemical manipulators to test the value of M. LE MOIR's assertions. For the purposes to which it is alleged the electric light is applicable, according to M. LE MOIR, the character of the lamp is of slight importance. The main consideration is the power of the battery, and the economy of production. If we arrive at a satisfactory result on these points, there can be little doubt that adequate means will be found to obtain a continuous action, without resorting to the uncertain or objectionable details of either the perfluent or percolating systems. We may instance a very simple and efficient contrivance for self-acting renovation, which has been, and we believe, still is, employed in the Dublin Ordnance Establishment, by the superintendent of the electrotype department. By many we may be deemed visionary in devoting so much interest to this subject, which till recently has been regarded by all as chimerical. Those, however, who have followed the progress of discovery in electro-magnetism, will indulgently accept, as our apology, the words of NAPOLEON, on the occasion of his founding an annual prize of 100,000 fr. for the best discovery in electricity—"Mon but special est d'encourager et de fixer l'attention des savants de toutes les nations sur cette partie de la physique, qui est à mon sens le chemin des plus grandes découvertes." The glance of that mighty genius, at a vast bound, passed to a vision of wonder, which the puny intellect of the succeeding age was unequal to contemplate. The glory was too dazzling for all, except his eagle eye.

Could we have witnessed a prime minister of this or any other country proposing an annual grant of 4000l. (say, 200,000l. in 50 years) for such a purpose, and offering as a sacrifice at the shrine of science the perennial martyrdom of financial economists of the HUME school, we might suppose that some master-mind had, since NAPOLEON's time, appreciated the vast idea he conceived. A race of mere courtiers replaced him in the power of leading to great achievements, and partially impeded the plans he projected. Now, however, a wonderful change has, after a brief interval, taken place—so that he would be a bold, and we will add an unwise man, who, understanding the present state of the question, will venture to say, that the object proposed is impossible of attainment. We may, therefore, be permitted to hope for the speedy solution of this interesting problem; and should experiment bear out the theory of this battery, the distance to be passed over to arrive at the desired goal will be considerably diminished. In acknowledging candidly our desire that such may be the case, we do not forfeit our claim to impartiality. None of those who can propose anything really useful shall want an advocate where we can assist; but we will bind ourselves to no particular project—for, in the public interest, we can even now discern, that the measure which will lead us most directly to success, will be a combination of several parts, to be contributed by various hands. In fact, the company to bring out the electric light will be one which must adopt the lamp of A., the conductors of B., and the battery of C.

In another column we give an extract from the *Technologist*, which proposes a further modification of BUNSEN's theory. It will be the duty of the professor of chemistry to decide upon the relative merits of the two arrangements. There seems to be advantages peculiar to each.

Adverting to the communication in our last signed "Black Diamond," we beg to be clearly understood, that we do not pretend to define the uses to which the electric light may be applied. We have merely given the views of the inventors; and, indeed, in the crude state of information on the subject, it would be absurd to go so far in advance of actual facts, as to give a pledge for the feasibility of all the proposed applications. To say that it is available

for mining purposes, would be exceeding our present anticipations. We candidly confess that this is one of the last achievements to which we look forward. Not that we believe it absolutely impossible, but we see clearly all the practical difficulties, which must be manifest to every one familiar with miners and mining operations. We fear that an entirely new system of working must intervene before anything can be effectually done to establish the best means of illuminating mines.

There is one point which our correspondent seems to misapprehend, arising, we believe, from a very deceptive definition in one of Mr. STAITE's patents, which attributes to the electric spark the absence of combustion. This is a great error, and our correspondent will convince himself of the truth, by holding his finger in the vicinity of a pair of carbon points, attached to a 30-cell GAYDA or SARRA battery. If the word *combustion* continue to have the meaning attached to it by lexicographers, the term must be attributed to electricity in the highest degree, and all that the dim "DAVY" will do in the way of explosion, will be effected with a vastly greater rapidity by any amount of electric incandescence.

Another correspondent, "E. L.," has passed some strictures on the position of Mr. STAITE, which were anticipated in some of our previous observations. Conceiving that fair excuses might be found to palliate what we deemed objectionable, we abstained from having recourse to any harsher measures. It was, nevertheless, our duty to give insertion to "E. L.'s" letter, because we concurred with him in the opinion, that there is some cause to complain of the manner in which the parties have come before the public. On the other side, we give the answer of "W. C. E." to this accusation. Certainly the argument used precludes all present discussion, and we accordingly leave Mr. STAITE and his friends to take their own course, well satisfied, as we are, that they will not be allowed to sleep on their projects.

The erroneous construction so frequently persevered in of the term "Cost-book System," by parties bringing new enterprises and adventures before the public, we have repeatedly endeavoured to explain, and to caution parties who might be induced to join them from the specious pretence put forward, that they are to be conducted on the Cost-book System. We have repeatedly stated, and again would we impress upon all adventurers in mining, or other undertakings, that the true Cost-book System is exclusively acknowledged by the Stannaries Court, having jurisdiction over the mines of Cornwall; yet, notwithstanding this oft-repeated and well-known fact, not only do we find enterprises not strictly mining, or confined to the county, held out as lures to the public, that they will be conducted on the Cost-book System, but prospectuses are continually being circulated relative to undertakings in Spain, France, Switzerland, and other foreign countries, and gravely stating that the affairs of the companies are to be conducted on the Cost-book System, recognised by the Joint-Stock Company's Act, 7 and 8 Vic., cap. 110, sec. 63, as if a strictly local law, confined to a single county, and judicially acknowledged by the Legislature, could be binding on parties in England advancing capital for the working of mines under foreign Governments—just as effective would it be in China or Japan.

We would, therefore, again call attention to the fact, that the Cost-book System is a simple agreement between a certain number of individuals, to which all affix their names in a book, and thereby bind themselves honourably to perform all acts mutually undertaken by them for two months, relative to working a Cornish mine. At the expiration of that period, they meet again, divide the loss, or share the profits, and commence another two months' working, or dissolve and divide the assets; or should any individual partner wish to retire, he can do so by paying his share of liabilities, when he is equally entitled to his share of the value of the assets. This agreement is valid in Cornwall, and acknowledged by the Stannaries Court; but it is not acknowledged by other courts of law as applicable to any other county, where the usual laws of partnership must be abided by—Wales, Anglesea, Derby, and other mining districts, having their own peculiar customs and privileges from time immemorial.

After the stagnation in our commerce, the diminution of our home trade, and the decrease in our manufactures, which so alarmingly paralysed our efforts during a great portion of the eventful year 1848, it is generally believed that a reaction has taken, or is about taking, place; and every aspect in the political horizon tends strongly to confirm the supposition, that a greatly-increased demand will now be made upon us for every description of our manufactured goods—a demand not merely the result of a momentary fluctuation, but one which will be permanent, and tend to relieve every class of society from the dilemmas in which they have suddenly found themselves unhappily placed. As the question of emigration is now a so much canvassed topic of the day, it will be well to consider whether, with our manufactures in full work, our miners in remunerative employment, our smelting-furnaces in blast, and our agricultural labourers obtaining that support from the culture of the soil which is their due, and which, under a well-regulated system, they would receive, whether England has not within herself sufficient resources to support in sufficiency and comfort her 30,000,000 of population. We noticed, in our last week's Number, a treatise on landed property, by Mr. JAMES BOYDELL, late of the Oak Farm Iron Works; and, as this gentleman's extensive experience as a land valuer and agent renders his opinions worthy of consideration, we shall now direct our reader's attention to a portion of his work on trade, statistics, and the currency—without, however, pinning our faith to the correctness of all his deductions, but leaving them for the impartial judgment of our readers. The population as returned, at the census of 1841, was 26,702,049; and, from the average increase, may be fairly taken at 30,000,000 at the present time; and calculating that, on the average, each individual adult and infant requires 2 lbs. of solid food per day, with a proportionate quantity of vegetables, will give a total of 9,776,788 tons per annum. The area of England is 31,770,615 acres; Wales, 4,752,000 acres; Scotland, 18,944,000 acres; and Ireland, 20,765,342 acres—making a total of 76,231,957 acres. Taking half the land as laid out in towns, roads, canals, railways, and wanted to support the horses of agriculturists and manufacturers, it is assumed that there are left 38,000,000 acres to produce the above quantity of food—being about 5 cwt. per acre. Taking one-half of this land as the best arable land, producing 15 cwt. of crops per acre, and pasture in cattle, sheep, &c., 3 cwt. per acre, and the other half being inferior land, producing only half this—gives an average of 6½ cwt. per acre, without saying anything of the greater weight of potatoes and green crops. If these assumptions are correct, and it is probable they are rather under than over estimated, we might feed the population to their full requirements, and still have 6,000,000 or 7,000,000 of acres to grow barley for malt, raise flax, or be added to pasture over and above the requirements of the population. The amount of clothing is also enormous; and few persons, without going into the calculation, would be aware of its extent. An adult man requires a suit of clothes weighing 12 lbs., and a woman 8 lbs.; and taking the average, including girls and boys, at 8 lbs., would require 107,142 tons weight, which, averaging at 2½ 10s. each, amounts to 75,000,000l., without beds, beddings, carpets, rugs, and other articles; and as the total export of our cotton and woollen manufactures does not exceed 35,000,000l., the importance of our home trade must be manifest.

After this statistical review, Mr. BOYDELL approaches the currency question, and proceeds to consider whether, with these facts before us, hundreds of thousands of the labouring classes should be able only to get a stunted and precarious livelihood, and that many manufacturers and others, who employ them, are worn down with anxiety and care, day by day dreading a crisis which may reduce them to the level of those they employ, and if there are not the means of providing the comforts of life and proper clothing for all, which leads to the question, that if the present manufacturing power of the kingdom was doubled, all that could even then be produced,



would not be consumed? An estimate is made of what really the wealth of the country is composed, and the fact is undeniable, that the land, and a large proportion of the moneyed wealth, are in the hands of a few; while the property of the many is the produce of labour, to an amount larger than all the land and money together; it, therefore, ranks first, but only becomes valuable after it is expended, and is then represented by the improved value of all materials on which it has been exercised.

This produce of labour ought constantly to be made available to the extent of the supply, and here Mr. BOYDELL affirms it would be so but for the circumscribing action of the laws on the circulating medium of the country. For want of a more free and extended currency, one man is forced to forego the employment of another; the cloth manufacturer cannot exchange his goods with the manufacturer of hardware, and neither can change at pleasure their goods for provisions; the clothes may be moth-eaten in the warehouse, minerals may remain in the earth, and the produce of the soil rot in the granaries, each wanted by the producer of the others; but the money laws forbid them passing from one to the other without the intervention of gold, or paper for which gold must be found on demand. Thus, from the inability of our population to purchase the goods they manufacture, the supply to be disposed of to foreigners exceeds the demand, and, the consequence is, a competition among our own manufacturers to supply them, which, by reducing the wages of the mechanics and labourers of this country, at the same time reduces the home consumption of their manufactures.

As sufficient gold cannot be got to pay the national debt, which was contracted in that metal, as the Bank of England, it suddenly called upon to redeem her issues in gold, must suspend payments, and as all the bullion in the kingdom is not sufficient to represent the money transactions of the nation, all tends to prove that the great evil we are suffering under is the want of a good equally regulating standard of money value, to maintain the relative one of labour and property, at the price, either in labour or capital, at which it has been acquired. As a remedy for this state of things, Mr. BOYDELL proposes an *ad valorem* duty of 20 per cent. on the importation of all produce which can be grown in the kingdom; and a repeal of the currency laws so far as they make the value of gold arbitrary, and do not allow a sufficiency of notes for the purposes of internal commerce. To the first of these we cannot agree, as opposed to all the progress of the free trade movements of the past few years; and as to the latter, we think the currency question has been tampered with enough already, and had much better be allowed to take its course, with the exception, perhaps, of granting larger issues of private notes, on giving due security. We have, however, exceeded our limits, but may return to the subject on a future occasion.

The proceedings at the half-yearly railway meetings, which have of late been so excessively numerous, have assumed an unusual degree of importance, from the depression in the value of railway property during the past few years, the disclosures made at some of them, and the apparent inevitable still further reduction of dividends in all, unless prompt and energetic measures be adopted to put the entire financial management on a totally reformed footing. We have ever, without in the slightest degree endeavouring to depreciate the importance of railways, attempted to show that, speculative as is the character of mining adventures, capital, judiciously laid out on legitimate undertakings, was, upon the average, more sure of ultimate good returns than in railways; and we insert a communication in this day's columns on the subject, which truly supports our view of the ease, and with our correspondent's observations we most cordially agree. We recommend both our mining and railway readers to the remarks of "Placer," believing that the deductions he arrives at, and the recommendations he holds forth, are founded on reasonable grounds, and the soundest views of the subject.

Our Aberdeen contemporaries should make themselves intelligible, if they wish to be understood; but, perhaps, it is not convenient for them to do so. It may answer their purpose better to let their conclusions be as clear as possible; while the means by which they arrive at them are involved in a labyrinth of mysterious verbiage. Our remarks on Aberdeen affairs must be of some consequence, otherwise it is worse than idle for both the *Herald* and the *Banner* to waste their space in weekly lengthy attempts to reply to us, notwithstanding the opening protestations of the latter that it intends to be very brief. We shall certainly not occupy our columns any more with a subject of which every impartial reader in Aberdeen and elsewhere must admit, that we have taken the right view, and that we have clearly established it. We could ask the editorial writer in the *Herald* a few questions regarding his connection with the *clique* in their palmy days, when, during the railway mania, some of their shares were issued at a premium, as well as regarding a few subsequent indulgences which he may have experienced; but, unless he wishes it, we shall not require any explanation from him on these points. We have received a long letter on the North British Australasian Company from a correspondent, which was first offered to our contemporary, but which it declined to publish, for reasons which it can best explain. We have said so much on the subject lately, that we consider it unnecessary to insert it at present, particularly as there has been no answer as yet to our previous remarks. We certainly think, that it would be far more advantageous for all parties if matters were placed in such a light that there could be no cause for any one interested to be under a misapprehension as to the real position of the company.

By the recent arrival of the American packet, *Wisconsin*, at Liverpool, we are put in possession of the latest intelligence from California; the accounts, in some measure, confirm previous statements as to the extensive nature of the deposits, but still they are very unsatisfactory, and contain many discrepancies, which we cannot reconcile. While some inform us that new discoveries of riches are continually being made—that large quantities of gold had been discovered near the North Fork of the Sacramento, where one man gathered \$12,000 worth in six days, and three others, in a single day, had obtained 36 lbs.—we are by others told that the Californian placers are no richer than many previously discovered deposits, which have not only been washed out of gold, but out of memory. In fact, strange as it may appear from the period of time elapsed since the first discovery, we have yet received no authentic information, by which to form any opinion as to the riches of the country, or the full continuation of the supply, of which hardly a guess can be ventured. The following extract from the *New York Herald* embraces the principal news from California, and the state of the gold finders:—

There has not been as much sickness at the placers as we were led to suppose; neither is there as great a scarcity of gold as has been intimated. Fever and ague prevail there to a certain extent, and attack those who are careless in regard to their health; but, with ordinary prudence, persons can get along without any sickness. About a dozen of persons have died at the gold diggings, principally from want of prudence, and exposure. The whole value of gold which has been gathered in California, is estimated by those acquainted with the matter at \$3,000,000—two of which left there in various ways, and the remainder is on its way to the United States. It must not be supposed, however, that every one gets rich there on the moment; for the work of getting the gold-dust and washing it is very arduous. Capt. DALY, of San Francisco, organised an expedition of 10 men, who went to gold digging, and were absent three weeks; but they did not gather enough to cover expenses, and were disbanded. Real estate was selling at enormous prices; lots, 25 yards square, selling for \$10,000. Provisions were abundant at San Francisco and the diggings. Flour poured in in great quantities from Chili and Oregon, and came down in price, from \$25 per barrel to \$16, at San Francisco. The probability is, that that article has fallen still further—perhaps, to \$10 per barrel. Board in San Francisco was \$10 per week. Great as the discoveries of gold are, they are equalled by those of quicksilver. The metal is found in various parts of California, and the quantity is as abundant as it is in the mines of Spain. Mr. FORTNER, the proprietor of the mines, had \$30,000 worth of the article on hand at Tepec, ready for market. It is found even within three miles of San Francisco. About 2000 emigrants had arrived in California from Oregon, the Sandwich Islands, and different parts of South America and Mexico—in fact, the gold fever rages as fiercely in Mexico as it does in the United States, and there, as well as here, expeditions are formed. The ship, *Huntress*, was sold for \$40,000, and her purchaser intended to send her to Valparaiso for a cargo. At that place there was, at the last date, great excitement in regard to California. The cargo of the ship, *Undine*, which was reshipped at Valparaiso, was sold at Francisco at \$60 per cent. profit. The vessel was sold at Valparaiso for \$15,000, and afterwards resold at San Francisco for \$25,000. Capt. PHILLIPS, of the barque *Moscow*, and Capt. LINDEBA, and Mr. MELLOWS are on the way to the Atlantic with \$100,000 worth of gold-dust. EDWARD H. HANSON is appointed collector of San Francisco, and will prevent the ingress of speculators into that port. The bark, *Tuso*, sailed from San Francisco for Valparaiso; but could

not engage a crew under \$50 per month to each man, and \$75 to the steward, with an agreement to take them back to San Francisco. The *Californian Star* and the *Californian* are united, and the new paper is issued under the name of the *Californian*. The brig, *Mary*, was to leave San Francisco for Mazatlan about the 1st of January with gold-dust. Capt. BROWN, the agent of Howland and Aspinwall, had left San Francisco for Vancouver's Island, for the purpose of arranging for a supply of coal for the Pacific steamers. We learn by this arrival one very important fact—namely, that the Sacramento river is navigable for vessels drawing 8 ft., from the ocean to Sutter's Fort—a distance of 150 miles from San Francisco, and for a 100 miles further by vessels drawing less. The rumours concerning Col. STEVENSON and Capt. MARCY making so much money are, it seems, false. Col. STEVENSON did not arrive at the placers before October last, when the season for gold digging was over, and, therefore, could not have accumulated so much gold-dust as has been represented. Capt. Marcy, it appears, has not been at the gold diggings at all. The American steam-ships on the Pacific have not yet got permission from the Mexican Government to touch at Mazatlan or Acapulco for coal, in consequence of the tonnage duties.

Other information from private letters state, that the country is full of lawless men, who are committing the most shocking outrages—murders and robberies being of daily, nay hourly, occurrence; and that within six weeks more than 20 murders have occurred in a population of less than 15,000. Reports of mutinies on board vessels freighted with gold have been confirmed, and much uneasiness prevails among shippers in consequence. An arrival from Callao states, that the *Adelina* had been taken into that port, and that eight of the mutineers were promptly executed. The better disposed portion had begun to act in self defence, and three men had been executed by Lynch law, for making free with others' findings. The United States revenue laws are stated to be in operation at San Francisco, and would produce about \$450,000; the inhabitants were in a state of much dissatisfaction at being subject to a tax without any protection of a Government. It is estimated that \$4,000,000 of gold, worth \$16 per oz. troy has been taken away for shipment. One letter states:—

"Many are now returning sick from the mines, arising from exhaustion and from irregular living, and many are dying from want of attendance and the ordinary comforts of life, while their hard earnings lie under their pillow (if pillow they have), in the shape of 1 lb. to 10 lbs. of gold dust, tied up in a dirty rag; two of these cases occurred yesterday, and two more to-day."

A disbanded soldier from Col. STEPHENSON'S regiment, in a letter published in the *New York Express*, states that he has scraped enough of the dust to make him comfortable for life, if he can only get it shipped for New York, but would not go through the same amount of suffering and privation for ten times the quantity. The whole amount of gold collected since the excitement first broke out is estimated at \$4,000,000, but this he thinks an exaggeration.

From the official communications of Mr. T. AP-C. JONES, the Commander-in-Chief of the United States forces in the Pacific, it appears that desertions from ships arriving in port were less frequent, owing probably to the commencement of an inclement winter, rendering it impossible to endure the rigid climate without good houses and plenty of food—that incredible quantities of gold were daily being collected, and scarcely a week elapsed without rich discoveries being made. It is said that a small party of five or six persons struck on a "pocket," as a rich deposit is termed, and realised \$30,000 worth of pure gold in two days. Having had ample opportunities of well considering the subject, he is satisfied that the disposal of the gold regions of California is the only practical disposition that can be made of them in the present disorganised state of society there. Not only are the murders above mentioned confirmed, but the worst forebodings of evil are daily realised. In one instance a respectable ranchero, his wife, two children, and six servants, have fallen victims. The man, whose name was READ, had been very successful in the diggings during the summer, and had returned to his house, near Santa Barbara, with a large amount of gold. The house was surprised by an armed party, the whole family barbarously murdered, and the house rifled of all its treasure, while the perpetrators are still at large. The principal outrages are on persons returning with gold, who, if not murdered, are plundered of their all by prowling thieves on the margin of the valley. He expresses his sorrow to be obliged to add, that all these villanies were committed by disbanded volunteers, runaway sailors, and deserters from the army and navy of the United States. The people were preparing to organise a provisional Government, until Congress could establish a territorial organisation, which could not take place the session then sitting. Official accounts from Valparaiso state, that hundreds of the citizens of that port were leaving for California—that the English monthly mail steamer had arrived with 100 passengers, and \$350,000 in specie, and that a barque had arrived, 46 days from San Francisco, with \$130,000 in California gold dust, reporting a vessel near at hand with \$100,000 more. European adventurers are reminded that a feeling adverse to their enterprise in the gold region is very likely to arise, on the ground that the whole country is United States property, and that strangers have no right there.

Thousands of enterprising young men, armed with implements for digging, washing, and assaying, are on their way to the gold region, and thousand preparing to follow. From the best calculation which could be made, 178 vessels had left the several ports of the United States, conveying to the shores of the Pacific 11,160 passengers since the excitement commenced, and it is estimated probable that, by the 1st Jan., 1850, from 50,000 to 100,000 Americans will be located in California. A number of companies were forming in the Western and South States, to proceed over land to the Sacramento; and at a public meeting of the Oregon and Californian emigrants, recently held, the pass discovered across the mountains of California (Sierra Nevada) by Captain LAWSON is pronounced one of the finest and most practical mountain passes in the world, with an ascent and a descent easy and gradual.

A project of the grandest character, and one befitting the enterprise and spirit of the age, has been suggested and introduced to the Senate by Mr. THOS. H. BENTON, the senator from Missouri, whose bill has been read a second time, and referred to the military committee. This is the formation of a noble national road from Missouri, near St. Louis, across the continent of America to the bay of San Francisco, with a branch up the Sacramento and along the base of the Sierra Nevada, to the tidewater of the Columbia river. This highway to be one mile in breadth, on which eventually can be constructed a railroad, a plank road, and a Macadamised road, facilitating all descriptions of travelling by steam, caravans, pedestrianism, &c., as the case may be. The road to be free to all nations for ever, and guarded at proper distances by military stations, and it is highly probable this truly grand scheme will be carried out at least in the next session of Congress, as it can be accomplished with ease, with no very extravagant outlay, as the property of the land along the entire route is now vested in the United States, and there would be only a few Indian claims to settle. Such a road would tend much to populate Oregon and California, would render San Francisco the finest port in the world, and a vast emporium of commerce. It would transfer the passage to India from Europe to America; and the European merchant, as well as the American, would cross the American continent, causing the rich commerce of Asia to flow through its centre, enriching and fertilising the state, and carrying colonisation and wealth in its progress.

The demands at this moment making on the energy and enterprise of the British Government and people, are such as were never exceeded at any antecedent period of our history. In the two imperial islands, a population where the thronging units are elbowing each other for room, and asking for a larger theatre and a freer space in which to exercise their powers, and to improve their capacities, a population which for numbers, leaving at present all other points out of the case, does not stand on the same area in any part of the habitable globe—in the east, an empire requiring, in some of its most magnificent parts, her conquest and further consolidation—in the south west, a third empire, springing into vigorous life, and asking for the laws, the civil institutions, and the armed protection of the parent state. The whole of these tasks of political Government, and of public defence, which have spread themselves east to the Yellow Sea, and west to the last waves of the Pacific, are set in motion and superintended by thirteen gentlemen, who meet from time to time in a small room in a small house, in Downing-street. If wonder sprung up any where, it would not be that the administration of so world-wide an estate was occasionally defective, but rather that the instances of error were not ten times more numerous and more serious than they actually are.

A new duty is now added to those forming the long catalogue of Ministerial obligations. We have brought the Ganges and the Indus within a short and a calculable period of London, and we require to do the same thing with the western coast of the American continent, with the Australias and the Polynesian groups, which glitter through the vast Pacific. To do this, we must pierce the Isthmus of Darien, and save thereby in getting to the south-western world

a distance of about 8000 miles. There are several routes and several methods purposed of making this narrow neck of land a medium of communication between the two oceans.—First, by two ship canals running into, and springing from, the lake of Nicaragua.—Second, a shorter route, without the help of natural waters, and by canal only; and third, by cutting a double line of railway through the mean breadth of the isthmus—namely, from Chagres on the Atlantic, to Panama on the Southern Ocean. Whatever route is chosen, the difficulties are, we believe, of a very formidable character; but certainly the advances of scientific engineering within the last quarter of a century, have furnished us with powers of construction, and resources of art in this direction, which are quite able to surmount the hindrances which, in this instance, present themselves. The vast utility of the work is a fully competent motive for its accomplishment. Indeed, looking at the greatly increased numbers which in a few years will fill the solitude of those fertile shores, which in the distant south are subject to the British sceptre, and to the increased commerce necessarily arising out of an enlarged accumulation of numbers, that we should have a shorter and readier access to them than that most dilatory and circuitous one hitherto existing, is of all things imperative and indispensable. To do this new work—to accomplish this triumphant task—is the peculiar privilege and business of the British people; they have the largest reason of any living nation to gird up their powers to the compassing of this great purpose. By such a work, we should leave in the New World another monument of the diligence and cordiality with which we devote ourselves to objects calculated to promote public convenience and universal commerce.

#### IMPROVEMENTS IN SMELTING COPPER ORES.

We briefly noticed some time since the specification of a patent taken out in this country by Mr. J. P. PENNY, being a communication from his brother in South Australia, for an improved process of smelting the oxides and carbonates of copper, by which the employment of the ordinary fluxes may be superseded. The following is the specification alluded to:—"These improvements relate to the smelting of those descriptions of ores of copper known as the carbonates and oxides, by means of leaves, chips of wood, charcoal, and similar carbonaceous matter, whereby the use of the ordinary fluxes may be dispensed with, and the carbonates and oxides decomposed at one operation. The furnace which I employ is similar to the melting, or reverberatory, furnace, in common use at Swansea and Holywell, but with this difference only, that the crown has a greater proximity to the bed or bottom of the furnace, for the purpose of concentrating the heat upon, and keeping the flame effectually in contact with, the ore. The fire-place is of somewhat larger dimensions than as ordinarily constructed, so as to be sufficient for the reception and use of wood as fuel. The ore to be smelted is broken in pieces, or ground, as may be deemed most convenient. The furnace having been raised to a sufficient temperature, ordinarily described as a white heat, the ore is introduced through an opening in the crown, and evenly distributed over the floor of the furnace. I then throw in leaves, chips of wood, charcoal, or other similar carbonaceous matter, which I mix with the fused mass, and thereby effect the decomposition of the ore, taking care to employ a sufficient quantity of carbonaceous matter for that purpose. Or the carbonaceous matter may be mixed with the ground ore, and introduced with it into the furnace, instead of separately, as already described, when the ore is broken in pieces. The decomposition of the ore having been effected by this means, the copper, separated from its compounds, is received in a cavity in the bed of the furnace, and may be tapped and run into moulds, by drawing out a plug in a hole in the cavity. This process having been completed, a second charge may be introduced, and the operation above-described repeated, the scoria and other extraneous matter being removed from the furnace as occasion may require. Having now described the nature of the said invention, and in what manner the same is to be performed, I wish it to be understood that what I claim, as the invention intended to be secured by the said letters patent, is the decomposition of the carbonates and oxides of copper, by the use of leaves, chips of wood, charcoal, and other similar carbonaceous matter, in the process of smelting such ores, as above described." We do not expect this patent will ever be brought into operation to any extent in this country, where coal and the necessary fluxes are so plentiful, although the ores from South America, Cuba, and Australia are of the character described. The Chilean and Cuban ores are, however, seldom free from an intermixture of the sulphurets, and consequently, cannot be reduced without the usual fluxes; and in Australia circumstances indicate that but a short period will elapse before, instead of the ores as taken from the mine, we shall have the metallic contents sent to this country, if not as pure malleable copper, at least as a regulus of high per centage. To the proprietors of the copper mines in this flourishing colony, the invention will be of immense advantage, saving the freight of the worthless portion of the ore, and, probably, opening up to them the markets of India, China, and the whole of the Pacific. Mr. PENNY, of Adelaide, has already constructed extensive works for a beginning, consisting of four large furnaces communicating with one chimney-stack, built entirely of freestone, 40 ft. high, and which he expected to get into work the second week in November last; and as at present there is an inexhaustible supply of wood of all descriptions, the smelting operations will, doubtless, be economically and profitably conducted. We shall, most probably, be very shortly in possession of details of the results, which we shall, of course, lay before our readers.

REFINED IRON OR METAL.—It is now pretty generally admitted that Mr. BLEWITT'S patent process for refining iron, intended for malleable purposes, is a great improvement on the old plan. We are informed that the loss of iron and consumption of fuel are diminished one-half, while the produce of the metal, in bars, boiler-plates, &c., is wonderfully improved in quality. We attribute Mr. BLEWITT'S success, in a great measure, to the fact that, in his operations, the iron is never brought into contact with the fuel. In the old refinery-furnace, the coke and iron are mixed up and stirred together with the greatest care and diligence, as if the object was to amalgamate the one with the other. Hence every part of the iron is impregnated with some of the impurities of the coke; and portions of the iron uniting with those parts of the coke for which iron has a particular affinity, run off in cinder. The loss of iron in this way is often from 3 cwt. to 3½ cwt. on Welsh pigs, and, if report is to be credited, from 6 cwt. to 7 cwt. on Scotch. Mr. BLEWITT informs us that the average yield, in his furnaces, of good malleable iron is from 1 cwt. to 1½ cwt. per ton. So important a saving deserves the attention of every ironmaster.

NICHOLSON'S IMPROVED STONE-DRILLING MACHINE.—We have received a lithographic diagram, from Mr. EDWARD NICHOLSON, of Newcastle-upon-Tyne, with a description of his new machine for boring or drilling stone, which appears to us at once powerful, simple in construction, and well adapted for the operation. It consists of a strong frame of wood or iron, similar to a pile-driving engine, fitted on wheels, to enable it to be removed from one position to another, having regulating screws at the corners for adjusting it to the several inequalities of the surface on which it may be required to stand. On a main driving shaft is the fly-wheel, and a crank, connected by a connecting rod to a carriage in the upper part of the frame, sliding up and down in vertical guides; this carriage is armed with levers, so arranged that, on its descent, they grip the upper portion of the drill; and, on arriving at a proper height, they separate, and allow the drill to fall. The carriage has grooves, which work on slides; and, being placed on the skew, and slanting in opposite directions, give to it, and with it the drill, a slight rotary motion when in the act of being raised—so that the edge of the drill may be presented in a continually altering position upon the work on which it operates, and secure the cylindrical form of the hole. This machine, with large-sized drills, worked by four men, or one horse, will put down a 4-in. hole, in hard stone, at the rate of 2½ to 3½ ft. per hour. Lighter machines, worked by two men, will put down a 4-in. hole, in ordinary freestone, at the rate of 5 to 6 ft. per hour, producing a very large saving of labour over the old system. The large hole, by concentrating the charge, will raise a greater quantity of stone, and keep it in larger masses than shallow holes of small gauge. A further saving is effected by a peculiar formation in the drills, by which much greater durability is secured than by the old plan; and when they require sharpening, the operation is greatly facilitated.



## Original Correspondence.

## RAILWAYS AND MINES.

"They'll sit by the fire and presume to know what's done in the Capitol."

Sir,—The moment does not appear inopportune to institute a short inquiry into the relative merits of the question of investment in railways and mines; and as this matter may be considered, in a country like this, where such large masses of spare capital are constantly seeking a safe medium of investiture, as one of paramount importance at all times to the capitalist, it must be particularly so at the present time, when the actual condition of railway property is undergoing such serious and rapid changes, as to render it problematical whether there is now much choice left to the present holders of railway stock between a diminution, or entire withdrawal, of their interest, as the means of saving themselves from the consequences of a probable future depreciation. Purchasers at low rates have, of course, secured a fair rate of interest for some time to come at least; but the far larger class are those who have bought at high premiums, and who are exposed to the double inconvenience of diminished dividends and loss of capital; and it is to the latter we think our remarks will prove most applicable.

We do not hesitate to express a decided opinion on this matter, from the facts before us, as elicited at the late numerous railway meetings, showing the absolutely crippled state of most of these gigantic concerns as the consequence of multifarious errors in management, amongst which extravagance is a prominent item; but the main evil, and it is one of a permanent character, affecting railway property, is the purchase or guarantee of competing lines and extensions—the obligation of paying guaranteed dividends upon some, and the apparent necessity of working all at a loss, with the vain hope that they may become remunerative hereafter. The evil here described is in course of augmentation too, by the cost of the various works and extensions creeping with the efflux of time into the balance-sheets of almost every company. To take an instance—the Brighton line. Who but can admit that the bringing this fashionable and salubrious coast town within one hour and a half of the metropolis, was certain to pay its promoters and shareholders; and it did so pay, until an unhappy rage for pushing the rails everywhere seized the directors, and led them to penetrate the "wealds" (the very name implying a thin population) of Sussex, in every direction, a county without ports, manufactures, or people enough to sustain so expensive a system as railway formation and locomotion as at present constituted. The consequences, which might have been foreseen had not cupidity blinded the perceptions of the originators, are now visible in stock at a discount of 40 or 50 per cent., and dividends for the future of doubtful amount. Why not at once close the unprofitable branches? Why perpetuate an evil clearly without any remedy but this?

Whoever has travelled on the Eastern Counties line must have observed trains constantly filled, and the returns of the company show a goods' traffic of enormous extent—the supposed greatest railway mind in the kingdom was at its head—and yet, from some complicated mismanagement, its shares can hardly be given away at one-half their paid-up price! Is the secret here, too, in the extensions grasped at with avidity, and pushed into unproductive districts? Time will show from what general cause arises the uncomfortable consciousness of directors in their present position, which reminds us of gingerbread, after exposure to a damp atmosphere. With regard to the chairman of this company, we suspect he has already very much jeopardized his position with Madame Tussaud, and it will be curious to learn hereafter, that the wax of the present potentate has been moulded into some future dominant mind in railway affairs.

We assume, then, that the present rate of dividends in most railways cannot be maintained—that the fall may be a serious one—that the main evil is the extensions and branches being unremunerative, and absorbing the legitimate profits of the trunk lines; and that the evil will remain, or increase, so long as the working of unprofitable ground is persisted in.

In quitting the direct consideration of this subject, and drawing attention to MINES, we do not intend to assert that they are free from risks and depreciations, and sometimes serious ones, in proportion to the sum invested; but we are prepared, and hope we shall be able to show clearly, that at this epoch mining property (every allowance being made for its speculative character) deserves the attention of the capitalist. Mining shares, as brought into the market for sale, generally represent one of the four following classes:—

1. Mines paying dividends.
2. Mines upon which an outlay has been made, and the lodes reached; but the expenditure thereon greater than the returns of ore.
3. Mines upon which shafts have been sunk and levels (more or less) driven, or so far only partially developed, as to show the probable future success by "indications" of ore, and in which the lodes underground have not yet been seen.
4. "Setts" (not mines), or a plot of ground supposed, from certain surface appearances, to contain lodes; the upper end of a lode being formed generally of "gossan," and its character and size further ascertained by laying it bare a few feet, or fathoms, in depth, by which the "underlie" of the lode, or the direction it takes in descending, is also ascertained.

Investments may be safely made in either of these classes, as it is evident that class 1 would never have had an existence if class 4 had been neglected. It is now to be considered what is the knowledge or experience necessary to make a safe choice between them. The majority of those who deal in mining shares possess both mining knowledge and means to carry it out, and are, of course, the most successful speculators. No advice is requisite to them; they know what to take and what to avoid. The minority are the class of buyers, therefore, to whom we presume to offer such hints as our experience suggests.

When a mining "sett" (class 4) is offered, the first and most important considerations are, whether it is situated in a mineralised district more or less new, or more or less exhausted; what is the general reputation of the parties by whom it is offered, and its bona fide character? These points having been satisfactorily explained, the price to be paid for a share is the most important consideration, which, however, cannot be brought under any rule. It may be essential to state that a lease of a new sett is generally granted by an individual owner of land, without any charge for it, and the Duchy of Cornwall lands universally so; both parties looking forward to the prospective remuneration from dues, or a share (generally 1-12th) of the net value of the ores raised and sold. Thus parties presenting setts for sale have, in the majority of cases, obtained them on free terms, except the cost of the lease, and they are entitled to receive for a share just so much as they are entitled to as a fair price for their influence, tact, or zeal, in having obtained a grant of the land, inasmuch as all the work is yet to be done, and all the capital to be found. No rules can be laid down, therefore, beyond general ones, deducible from the facts stated; for the speculator is more often led by the fascinating character of a prospectus, than by personal examination or inquiry, or the employment of a known respectable mining agent, to examine and report on the sett. We need not add that this is the class in which more money is lost than in any other, or, perhaps, in all the others together; and the only safe course of proceeding is, therefore, to pay but a nominal sum for a share in the first instance, and to watch most narrowly the expenditure afterwards.

It is to be presumed that a mine, so far advanced as described in either of our classes 2 and 3, has had an existence for some years—has obtained a *locus standi*, and its site marked either by the tall chimney of the steam-engine, or the water-wheel, or both. It has its committee of management, purser, captain, and other officers, and is incurring a monthly expenditure, varying from 50*l.* to 200*l.*, and will so continue until the lodes are proved to be remunerative. The first element to guide a purchaser is the sum already expended upon the works, and its judicious application. It rarely happens, before ore is raised in sufficient quantity to pay the cost, that such shares when legitimately sold, realise beyond half, or two-thirds (and sometimes much less) of the proportionate outlay. The concern is still in its "speculative" age. Its fate is yet to be known; it may be worth nothing in six months, or 20 times its cost in one hour! The "lodes," be it here understood, pursue a capricious course in descending, become "fine by degrees and beautifully less," or the reverse. The skill of the captain, or manager, to whom is, in most cases, left the control of the mode of working, bears materially, first upon the progressive expenditure, and next upon the ultimate result. Mines are managed by captains of all degrees of skill and experience; but the best guarantee for success is that of a committee who possess, more or less, amongst them so much of mining knowledge as enables them to exercise a control over the work and expenditure. Intelligent minds will not require us to draw the deductions from these statements; they will do it for themselves.

A dividend-paying mine is still a speculation. It is known what was paid per share last year, and what is promised this; and some certainty is hazarded, even for a second and third year. Let us take a glance at the

position of the Great Devon Consols—the richest mine at present known in the world, in proportion to the sum paid upon the shares. It paid in dividends, for 1847 and 1848, 30,000*l.* each year, and a share is worth about 330*l.*; a buyer at this rate receiving 12½ per cent. per annum interest, and its value is therefore estimated at about three years' purchase, for which period ores are said to be in sight in the different levels of the mine. Considering, then, the extraordinary character of this concern, a dividend-paying share should give an interest of 20 or 25 per cent. per annum, at least since circumstances may put an end to the dividend in six or twelve months, or less, after the purchase.

We now arrive at the point from whence we started—"RAILWAYS AND MINES"—and our recommendations in favour of investments in the latter, if based upon the preceding facts and arguments, may safely be adopted, for the reason that, whilst capital is sacrificed in railways in masses, a large quantum of mining experience may be gained without risk of serious loss; whilst the gain upon one successful adventure often covers the losses upon half-a-dozen. We make no excuse, either, for a mining bias—"qui s'ex-cuse s'accuse"; but are content to let our views be tested on their merits alone. If, as we predict, the dividends in most railways must go on from this day diminishing, unless the companies be thoroughly reformed in every department of management, and non-paying portions of their concerns abandoned, this source of investment is clearly one to be avoided; whilst every accession of capital enjoyed by the mining interest tends to its more full development and increasing of the chances of profit—the end and aim of all investiture.—PLACER: March 10.

## GOLD—EXPERIMENTS.

Sir,—Amid the present mania for gold finding, the following particulars may not be uninteresting to your numerous readers. Some ten years ago I entered upon a series of experiments, in order to test the truth of a theory which I had formed concerning the stratification of the earth and the formation of mineral deposits, my ideas on those matters differing materially from those commonly received. Those experiments were attended with various gradations of success; but at length, by varying the form and allowing a longer time for the action of the supposed influential power, I obtained a result so decisive, that I considered it to have entirely established the truth of my views. Upon this I sought an interview with a gentleman well known for his researches in the particular branch of science to which my experiments had reference. I briefly explained my ideas to him and exhibited the formation which I had obtained. The professor, however (for such he was), attributed the result to an entirely different cause, and said, I must be mistaken as to part of my statement, which was entirely incompatible with his views; which was, in fact, but a polite way of disputing my word as to the whole affair.

This circumstance, though it caused a disagreeable impression on my mind, did not, in the least degree, shake my confidence; for, from the manner in which my experiments were arranged, it was most clearly a physical impossibility that the professor's views, as to the cause of the results which I had obtained, could be correct. But soon afterwards I had to remove from the scene of my labours, and for some years, moving from place to place, had neither time nor accommodation for prosecuting my researches in a satisfactory manner. A few weeks ago, turning out some lumber, I came upon one of my old experiments, which had been hurriedly put away on my removal, and, curious to know the state of its contents, I carefully broke it up. A material change had taken place in the distribution of the whole mass, and, running in a kind of spiral string through one part, I found some particles of a bright yellow colour, which at first sight I took to be iron pyrites. But, on examination, instead of exhibiting the mechanical properties of that mineral, the particles proved to be those of a true malleable metal. Collecting the particles, and washing them from their matrix, I found they were not acted upon by nitric acid, but I succeeded in dissolving them in nitro muriatic. From the solution, a solution of protosulphate of iron threw down a brown precipitate, and the protomuriate of tin, the purple of Cassius. I have no doubt, therefore, that the granules which I found were those of pure gold, and the question arises, how they came into the position where I found them.

I can, with the utmost confidence, state that, during the course of those experiments, I never had a particle of gold in my possession, in such a form that, accidentally or otherwise, it could have been introduced by me. The materials (a record of which was appended to each experiment) were all ways selected with the most careful regard to their purity; and no person had on any occasion an opportunity of tampering with my operations. I can, in fact, come to no other conclusion than that the gold had been formed there from other substances, and this idea is favoured by the fact that a certain other substance, a small portion of which had, for a particular reason, been placed in a particular position, had entirely disappeared from that position, and I could find no traces of it in the mass.

March 5.

B. C. D.

## SMELTING COPPER ORES—ELECTRICITY.

Sir,—In Mr. Leighton's communication, in the *Mining Journal* of last week, he refers to the Notice to Correspondents, in the previous Number, alluding to Napier's patent for smelting copper ores, and questioning the validity of the patent, on the ground of misdescription. Of course, it is impossible to guess where the Australian correspondent obtained his information; but if he, or Mr. Leighton, refer to the specification, they will find Napier in no way mentions the action of electricity, his claim being "for the application of iron and an alkali in smelting the ores of copper, and water for the purpose of disintegrating and decomposing the mass formed by such application." The operation is conducted on ores containing less than 20 per cent. of copper, and more than two parts of sulphur to four of copper; and, when not near these proportions, are to be mixed with other ores containing an excess of copper or sulphur, as the case may be; it is first calcined, melted in the ore furnace, the slag removed, and the metal tapped into sand or water. To every ton of this "coarse metal" is added 56 lbs. of soda ash, containing 50 per cent. of alkali, and 56 lbs. of slaked lime; when fused, the slag is removed, and for every ton of metal 1 cwt. of scrap iron is added. When the whole is melted, it is rapidly mixed, run into sand moulds, and, when set, put into water, where it soon falls into a black powder, which is removed to the ordinary calcining furnace, mixed with 112 lbs. of anthracite coal and 10 lbs. of sand to every ton of powder. The slag is remelted with fresh charge of ore, and acts as a flux. I perfectly agree with Mr. Leighton, that the action of iron on copper is purely the result of chemical affinity, and that electricity has nothing to do with it; and if the two French chemists he mentions be Messrs. Rivot and Phillips, he will find that they also make no claim for electricity in their discoveries, but that their process also consists in the use of iron in precipitating copper from its solution.

In the *Mining Journal* of the 23d and 30th of Sept. last an account is given of an experiment conducted by a commission appointed by the Paris Society of Arts, which was successful, but recommended by them to be confined to the oxides and sulphurets of copper. The ore, after roasting, contained 44 per cent. of peroxide of iron, 28 of dextoxide of copper, and 28 of silica. The charge to the furnace was roasted ore, 2 cwt. 2 qrs. 19 lbs.; lime, 1 qr. 9 lbs.; sand, 2 qrs.; slag of a preceding operation, 3 qrs. 10 lbs.; coal in small pieces, 20 lbs. Five hours after charging, the mass being in a complete liquid state, six bars of iron, weighing 3 qrs. 10 lbs., were placed in the midst of the scorified mass, each bar occupying the whole width of the furnace. After the expiration of four hours the metal was run off, and the bars found to have lost 4½ lbs. A malleable copper of good texture was the result, which a second fusion rendered sufficiently pure for commercial purposes, and the slag produced contained only 6½-1000ths of copper. It is quite true that, in their researches, Mr. Napier, as well as Messrs. Rivot and Phillips, experimented on the effect of currents of voltaic electricity in the reduction of copper ores; but it was soon found that the coal and the iron were alone, without the intervening aid of electricity, capable of producing all the decomposing effects required, and which Mr. Leighton attributes, I think, correctly to the law of chemical affinities alone. A patent, dated September 9, 1847, was taken out by Mr. J. C. Robertson, being a communication from abroad, in which the claim is for the joint action of heat and electricity in smelting copper ores. The plan is to transmit currents of electricity through the fused mass while at a high temperature; the consequence is, that the sulphur, phosphorus, and arsenic, are powerfully attracted to the positive pole of the battery; and their chemical affinities being impaired, they are more easily volatilised by the heat, and pass off in fumes, or vapour.—METALLURGICAL: Newport, March 6.

## THE BELLows SUPERSEDED.

Sir,—It has occurred to me, that a machine might be constructed to supersede the use of bellows in organs, forges, furnaces, &c., and be applied to most other purposes for which either a blast, or a continuous current of air, is required. If the idea is worth your entertaining, pray give it a

place in your Journal, or make what use of it you please. The machine to consist of one or more cylinders, to be fitted up similar to ordinary air-pumps, and made to a scale to meet the requirements of the purposes to which it is applied, to be worked by any simple machinery—say by a spring, or wheel and weight movement; or, if on a larger scale, steam or water-power, &c. The air to be forced through a valve into a reservoir, made to collapse and expand, and there compressed by weights, or springs, according to the intensity of the current desired. It would not be difficult to show the superiority of this machine over the ordinary bellows for organs, &c., the current being equal, continuous, and of what intensity soever may be required. This might not be well received at first, but, I have no doubt, from the model I made several years since, that the idea is capable of improvement, and the result will be of general utility, sooner or later.—EMANUEL DOMMETT: Red Lion-square, March 5.

## ANTHRACITE COAL.

Sir,—In perusing your valuable paper of the 24th February, my attention was arrested by some remarks on anthracite in a leading article. In the efficacy of this I have great faith, from its superior evaporative power over all other unprepared fuels, but must confess myself at a loss (if proved to be applicable to steam and locomotive engines 10 years since, at a saving of 30 per cent.) to find out how the keen economy of the Englishman, or the shrewd judgment of the go-ahead American, could suffer them to forfeit 6s. 8d. in 1*l.*, after being once taught to save it.

The extract from a letter, dated 1839, is but a poor criterion for the present day. Although I cannot vouch for the fact used on the Beaver Meadow Railway, I can safely say that which is used on the majority of American railways in 1849 is wood, and not anthracite.

Happening, however, to know something of the history of the Anthracite steam-boat, I must say that you are, to a considerable extent, misinformed on that head. The boilers of that boat were certainly constructed for the purpose, and with the intention of proving the applicability of anthracite coal to marine engines. It is equally true that she did, for a considerable time, ply on the River Thames, with apparent success, where she left Hungerford Market with steam strongly blowing off, and in her passage had probably to stop and ease her engines 20 or 30 times, during which intervals time was given her to recover steam; but I have been witness to her arriving at London Bridge from Hungerford Market only, and saw the engineer use some force to raise the valve before any steam could escape. I can also state that, previous to the same Anthracite leaving the river (and with the same boilers in), she became free burning, with a plate riveted over the hopper, and at a time when the London market was glutted with anthracite coal, at a very low price. Again, I was informed by a gentleman (now an extensive steam-boat owner), who, with much interest, had an opportunity of narrowly watching the experiment, that, "in the long run, it proved unsuccessful," adding—"If anthracite coal was the only fuel we could procure, I have no doubt that steam trade could still be carried on; but while such abundance of coals, so admirably adapted, throng the markets, I fear the day is far distant when that article will come into general use."

I have, in addition to the plan adopted in the Anthracite boat, seen many experiments tried, both on a railway and for other boilers, but never, except in one instance, saw that strong and lively flame produced from anthracite coal, which is so essential in the rapid generation of steam, and that was by the aid of a fan blast and hollow bars, which may, I believe, be now seen at a large snuff manufactory in the Minories. The circumstance of your quoting the passage from remarks on Pennsylvania anthracite, coupled with the knowledge of the facts quoted, induced me to pen the foregoing, as they appear to be confirmed by the original remarks; and with the view of facilitating the use of anthracite coal, I certainly think that the application of a fan-blast is a thing not to be overlooked, as its efficacy must be great—the power required, and expense of applying, being very trifling.—FLAME: Swansea, March 5.

## MANUFACTURE OF IRON.

Sir,—It appears to me that my brother, Mr. D. Mushet, quoting from memory, has somewhat erroneously stated the cinder question, and which is the more likely, seeing that his almost constant residence in the metropolis, and engagement in pursuits bearing no reference to ironmaking, or its details, has naturally prevented him from becoming acquainted with the subject to which I alluded in my remarks upon Mr. Booker's speech. There are some concluding remarks in Mr. D. Mushet's letter which, as directed to a brother, might well have been suppressed, even if deserved by the latter—remarks which very painfully evidence to me that amenity is not always attendant on capacity. The remainder of the letter is a confirmation of what I have advanced—viz.: that my father furnished and published ideas and correct views upon the subject of ironmaking for the benefit of the public, and that the public subsequently made a very proper and legitimate use of these data by adopting the principles laid down, and, in many cases, as with Mr. Hill's lime patent, improving upon the original idea. It is very naturally my desire, that my late father's inventions should be known as his, and, therefore, I am not inclined tacitly to see them ascribed to others. His labours have been pretty generally appreciated and acknowledged by private individuals, but I should wish to see them publicly acknowledged, and I cannot help thinking that a monument to his memory is quite as well deserved as many which have, from time to time, been erected to honour the names of public benefactors.

I agree with Mr. Leighton in attributing any failure which may have occurred at Mr. Yates's works not to the construction of the furnaces, but to the deficiency of the blast arrangements. I had myself long believed that height of furnace, and the consequent long protracted cmentation of the iron ores, or ironstones, were essentials in smelting these ores to the greatest advantage; but having clearly ascertained that cmentation is not necessarily a slow process, when carried on under favourable circumstances, and that, in fact, it is almost instantaneous when a mass of ore is presented at an adequate temperature, with gaseous carbon sufficient to pervade the whole of its particles, and combine with their oxygen, I come to the conclusion, that by increasing the capacity of the furnace hearth, and augmenting the number of tuyeres, so as to spread the blast over the greatest possible surface of ignited matter, a maximum quantity of gaseous carbon would be generated, and liberated to combine with the oxygen of the ore. By following out this principle, and diminishing the height of the furnace, increasing, however, the width at the top, and protecting the fuel from wasting, by means of a dome, or bee-hive, with apertures for filling at the sides, and a central opening for the flame to pass off through, I infer that a furnace 20 ft. high, and blown by 12 tuyeres—the discharging pipes being 2 in. diameter at the nozzles, and the pillar of blast from 3 to 3½ lbs.—would do nearly as much work as two blast furnaces of 50 ft. high, blown by three tuyeres, with nozzles 4 in. diameter each, and a pillar of blast from 2½ to 3 lbs. I believe with Mr. Leighton, that carbon has been often mistaken for silica, and vice versa in the composition of cinder. Carbonic acid forms with silica a compound—probably a chemical one—in definite proportions. I do not know whether chemists have investigated this subject, but it is worthy of their attention.

Coleford, March 6.

ROBERT MUSHET.

## IRON MANUFACTURE.

Sir,—Mr. T. H. Leighton, in a letter to you, dated the 24th February, states, blast-furnaces have been carried to 60 ft. and 70 ft. in height: now that such furnaces failed in the effects anticipated, is equally well known to the iron-maker, and have since been reduced to an average of from 40 ft. to 50 ft. With reference to Mr. Yates's proceedings in Derbyshire, Mr. Leighton says, he is inclined to coincide with Mr. Robert Mushet in his opinion as to the size and working of furnaces, and argues that the alterations already made by Mr. Yates may be attributed to the difficulties he has encountered with his new rotary engine and the management of the fans, rather than to the size and form of the furnaces. This, however, cannot be the case, as he had replaced the engine and fans by an engine and blowing apparatus, on a construction as in use at other iron-works, notwithstanding which he has since found it expedient to alter his furnaces, as before stated.

In the latter part of Mr. Leighton's letter, he puts the following query to me:—"Do you ever find furnaces work better than when you allow them to run down previously to blowing out?" I am aware that, generally speaking, furnaces work very well during the period of blowing out; but my experience on that subject leads me to attribute it to other causes than that of the bulk of the materials being diminished. As this is a mere matter of opinion, we shall both, doubtless, be much obliged to Mr. Yates if he will have the goodness to inform us of his present opinion as to the cause of his disappointment in the operation of his low furnaces. As the long continued controversy on the use of finery cinders in the manufacture of iron may naturally be expected to be approaching nearly to a close, allow me



here to make an observation on that subject. Mr. David Mushet, in his letter of the 19th Feb., states—"The successful use of finery cinders in the blast-furnace was, I believe, patented by Mr. Hill, and though it is many years since, I have a distinct recollection of my father attributing the sole and great merit of the application to him." It is, however, a well-known fact, that finery and all other cinders, "the produce of the forge and bar-mill," had been advantageously used in large quantities in blast-furnaces at iron-works in Yorkshire, for many years prior to Mr. Hill's patent, during which process it had been found that a greater quantity of lime was requisite than was used with ironstone alone.—AN IRON-MAKER OF THE THIRD GENERATION: March 7.

#### COMPRESSED-AIR-LOCOMOTIVE-IMPROVEMENTS IN MINING.

SIR,—In the last Number of your valuable Journal, you have kindly referred to my pamphlet, containing a comparison between my system of locomotion by compressed air, carried with the train, and the atmospheric system, as adopted on the South Devon line; and you have quite correctly stated, that the prime cost of establishing my system from Exeter to Plymouth, about 53½ miles, would, at the highest, amount to 124,000*l.*, and the minimum of capital required for the same distance for the atmospheric system would, according to Mr. Gill's pamphlet, amount to 480,000*l.* But I beg permission to point out your erroneous statement, that my annual saving in current expenses amounts only to 10,000*l.*, when you will find at pp. 14 and 15 of my pamphlet, that the minimum saving in coals alone amounts to 20,000*l.* per annum, and in wages and stores to 10,000*l.* together to 30,000*l.* per annum. I very much wish that railway proprietors and engineers might be led by these immense savings, and the advantages in safety and expediency, to doubt the correctness of my calculations, and call upon me to prove the same, which might induce them to apply the system for the benefit of the public and the companies themselves.

Allow me now, Sir, to address you as the friend and protector of the useful science of mining—which, through the information of your inestimable Journal, has of late so much progressed—in reference to the immense sacrifices of life of those unhappy miners, by suffocation, or explosion, and especially in regard of the last shocking explosion in the Darley Mines, near Barnsley, where about 80 persons lost their lives. It is my full conviction that ventilation, or a current of air alone, cannot prevent those accidents, often caused by self-ignition; and believing that the means to prevent such accidents permanently are unknown to proprietors of mines, who certainly would not expose the producers of their wealth to such an imminent danger of a horrible death, if they did know how to avoid it with certainty, and under all circumstances, I have, therefore, considered it my duty to inform you and the public that I have fully matured, and have ready in all details for immediate practical application, an invention which combines the following effects:—It raises the water in the most simple and cheap manner from the deepest mines; in fact, the advantages of this new and original mode increases with the depth. With this is connected a perfect and constant removal of fire-damp, and other obnoxious gases, from the most distant parts, and the narrowest channels in which the collier may be at work; and it will, at the same time, without any health or life-destroying violent draught of air, conduct fresh and wholesome air, as it were, to the mouth of the working miner. The whole invention being based upon the immutable laws of Nature, and the few apparatus and machinery applied so simple that hardly any essential part can get out of repair in any length of time, will, by freeing the mine of accidents, and protecting the life of the miner, greatly increase the happiness and mental comfort of the proprietor of the mines. Besides this, I can warrant that the current expenses to produce perfectly these three effects, will not amount to half of the cost for raising water from deep mines (the Darley Mine is stated to be 1800 ft. deep) in the present mode. Without all of boasting of my inventions, long known and protected by you—as the fire-grate, steam-boilers, metallic flues, paddle-wheel, and the compressed-air locomotive, which all have been successfully tried—I only refer to them to protect me against being suspected of meddling in sciences in which I had not sufficient knowledge or experience. From motives of humanity, and being myself unable, having so many other inventions in hand, to bring this life-saving scheme for miners into execution, I am quite willing and ready to give to proprietors of mines, or persons who have the means and an earnest will to bring such a useful invention into practical application, every facility and information.

88, Hatton-garden, Feb. 28. — BERNHARD VON RATHEN.

#### IMPROVEMENTS IN THE STEAM-ENGINE.

SIR,—My thanks are due to your correspondent, Mr. R. Mushet, for his kind, candid, and enigmatical remarks, given in your last Number of the *Mining Journal*, upon my inventions. Desistate as are my inventions of alluring tinsel, neglected (must I not add despised) as they have hitherto been, and stranger as I am to Mr. Mushet, I am, and I think your readers must be, convinced that such remarks emanated entirely from a due appreciation, acting upon a candid and generous mind. The remarks alluded to having such an origin, and prompted by such motives, are of far more value, in my estimation, than mere professional or partizan commendation; the more especially so as the author is quite competent to form a correct opinion upon the matter, and which opinion I am also quite prepared to confirm—not, indeed, by splendid models, calculated, as they too often are, more to excite the wonder and admiration of the superficial observer than to place beyond doubt the practical value of discoveries, or inventions. I will, whenever the public will give me the opportunity, confirm Mr. Mushet's opinions of my inventions by the practical working of engines, varying in power from 4 to 40-horse, which I have ready made by me, and with some of which I have already made more practical experiments, upon a large scale, than perhaps any one individual ever did upon the steam-engine. With these engines I will prove to reasonable, scientific, and practical men, that Mr. Mushet has not drawn a picture which has no reality. I have no desire to detract from the efforts of others, with a view to advance my own inventions; but all I ask is, that some share of public patronage and encouragement be awarded me; and then let the worth of my labours, and that of others, determine their relative claims, by the wide and varied good they will diffuse through the whole family of mankind. But, Sir, in the meantime, I dare to assert that Mr. Mushet will not regret having had the moral courage to commend to public notice my despised and neglected inventions.

Mr. Weston's letter, given in the above Number of your Journal, also demands from me a few remarks. The assertion, that the oscillating motion was the chief cause of the greater cooling effect produced, and that, had the condenser had a similar motion, the effect would not have been so striking, is obviously true; because it, in effect, amounts to saying that, had there not been action between the particles of water and the hot condenser, the effects due to motion would not have been produced, as two bodies, having the same motion in the same direction, are relatively at rest, in so far as their action upon each other is concerned. But as to the result of experiment with a condenser, constructed upon Mr. Weston's "correct scientific principles," I will not venture to predict, but will suggest two points for his consideration. The first is the great probability of his water spaces of  $\frac{1}{4}$  in. becoming choked up by foul condensing water; the other is, that although the temperature in the air-pump is, within certain limits, the determining cause of the amount of vacuum obtainable, yet it must be borne in mind, that the condensing water is heated by the steam issuing from the exhaust side of the piston, and that such steam has a temperature at all times corresponding with its pressure. If, therefore, Mr. Weston proposes to deliver the condensing water off, at the top of this condenser, at a boiling heat, or nearly so, it is of importance to consider what vacuum he will obtain on the exhaust side of the piston of the engine.

Birmingham, Feb. 28. — THOMAS CRADDOCK.

#### STEAM LOCOMOTIVES ON COMMON ROADS—TIMBER TRACKS.

SIR,—Several letters have appeared in your valuable Journal on the subject of introducing steam locomotives on common roads, but to effect this desirable object a locomotive must be made to suit the road, and a road made to suit the locomotive, and the same objects must be kept in view, precisely as in the construction of a railway. On every occasion in which I have seen Mr. Motley's name before the public in the *Mining Journal* it has been in connection with valuable practical suggestions—the construction of wrought-iron bridges, the principles of tension and compression connected with bridge building, and papers on many other subjects, entitle him to the highest credit, and I much regret that I cannot agree with him on his timber track system. Here we must clash, for timber tracks I am satisfied would be attended with the same results as was the wood paving in the streets of London, which has proved a miserable failure. I would just observe, that the first letter of "Road Locomotive Engineer" I consider was premature and uncalled-for, as Sir James Anderson's plans were not fully before the public, although Mr. Clarke's report was, in some measure, explanatory; but I give him credit for the remarks in his

second letter on timber tracks, and I fear the objections and difficulties he has pointed out would be found to exist to a still greater degree than he has taken credit for. I would suggest to Mr. Motley, in lieu of timber tracks, the use of granite blocks—say, 18 in. thick, and 2 ft. 6 in. wide on the top, the longer the better; two tracks of this material would, I consider, be infinitely superior to wood, and even limestone blocks might be made available, or any other hard stone. These substances are to be found plenty at home, the working of which would give employment to hundreds of people, make a better road, and be more economical in a national point of view, than sending to America for timber to form tracks which would be constantly requiring repairs.—LITCHES: Plymouth, March 6.

#### STEAM LOCOMOTIVES ON COMMON ROADS—TIMBER TRACKS.

SIR,—Having too much respect for your valuable columns, and the good sense and patience of your readers, to be a party in encumbering the former with useless invective and unmeaning remarks, which must be totally uninteresting to the latter, I shall not attempt any reply to Mr. Motley's allusions to me in your last Number, as the author of some observations on the above subjects in previous Numbers. He is so sore upon the matter, and takes it up in such bad spirit, that I must decline further discussion, productive of language which cannot edify or amuse, and must be tiresome to your readers. With your permission, I will, however, at an early day forward you some observations, as promised in my communication to you on the 22d ult., "on the causes of the failures which have hitherto taken place, and what are the essentials for securing the success of steam-carriages on common roads;" and whether Mr. Motley, and those connected with him, with his assumed perfect knowledge and experience in the matter, condescend to notice them or not, I trust they will be found tolerably correct data, and to convey general information on this undoubtedly important subject.

ROAD LOCOMOTIVE ENGINEER.

Rotherhithe, March 7.

#### STEAM LOCOMOTIVES ON COMMON ROADS.

SIR,—Having read several letters which have lately appeared in your Journal relative to steam locomotion on common roads, I observe that one of your correspondents, who signs himself "A Road Locomotive Engineer," has stated that he can lay his hand upon an old road locomotive, which in a week if he had time to attend to it, he would back in performance against Sir James Anderson's new one. Now, being much interested in this subject, and being desirous of obtaining a locomotive of average capabilities, I should feel much obliged by your correspondent informing your readers where it may be seen, as I am prepared to purchase the same, if it can be obtained at a reasonable price; as to the repairs, I think I could undertake the superintendence myself, should your correspondent be too much engaged. I should be satisfied if I could travel at 10 miles per hour, or even less, and am not particular about there being any provision for increasing the power, by diminution of speed, as the road I desire to run it upon is tolerably level. I feel certain, from all that yet is known of the matter, that steam locomotion on common roads must ultimately succeed, and I cannot help regretting that so much ill-feeling exists amongst those acquainted with the subject. It is a great pity that all the information cannot be brought to a focus; then, indeed, might we hope, and that immediately, to see steam locomotives on common roads successful.—EDWARD E. ALLEN: Lewisham-road, Blackheath-hill, March 6.

#### ON THE APPOINTMENT OF GOVERNMENT INSPECTORS.

SIR,—There are no fewer than five letters in your last Journal, on the subject of Government interference with mines, called forth by the late melancholy affair at Barnsley, each with views of his own on the subject. Mr. J. Sutcliffe says, that "they should inspect but not direct." South Staffordshire complains of the "doings in his district, which call for Government interference," while "N. B." says, the moment the Government inspector puts his foot upon the cage, "farewell to ingenuity and enterprise on the part of the manager," thinking that Government will provide the coalmaster with all the management required, and that Othello's occupation will be gone. Now I do not think Government interference would injure, but, on the contrary, I think it would very much improve colliery management, and would be an additional stimulant to ingenious and enterprising managers to outstrip their neighbours. No one will deny that Lord Ashley's bill has been the means of doing much good among the colliers, especially in preventing women from going down pits, and boys under 10 years of age; and yet this would not have been done if left to the colliers themselves, or to the proprietors of the works, for many years—may be, never. Again we see the beneficial working of Parliamentary interference with factories. Government does not dictate to the mill-owner what kind of house he must build, what kind of machinery he will erect, or what kind of yarn he will spin, but it dictates that his house shall be kept clean, well aired and warm, his dangerous machinery fenced in, and his spinners shall only work a certain number of hours a day; and, moreover, the children employed must be a certain age, and have been a certain time at school, before they commence work at all. Now this does not fetter the manufacturer, nor hinder him from improving his machinery; and when the Act obliges them all to do the same, they are all alike.

There are no laws or enactments which ever render mining a safe occupation. Many of the accidents which happen daily to miners are wholly the result of their own carelessness, such as falls from the roof, falls of coal, &c., and which no foresight on the part of the management can control or be accountable for. Yet there are defects in using the means well known for ventilation, which the workers have nothing to do with, as it lies wholly with the management; and this, in my opinion, is a most fit subject for Government interference. The universal practice of ventilation in mining, is to make a free passage from one pit to another, along the face of the working or other parts of the colliery, where men need to go, so that air may have free access to the mine by one shaft, and free egress from it by the other; and if Government were to dictate the size of this passage or air-course, with power to enforce it being kept that size, we would hear less of accidents from want of ventilation. It is not the want of knowledge of the means for making good ventilation, but the want of using these means, that so many accidents arise. I am aware different districts require modifications of the system, and for the purpose of arriving at the best one for each district, I would suggest that Government should cause committees to be formed in every mining district in the United Kingdom, composed of engineers and coal masters in the district, to examine the mines personally, and report as to the systems actually pursued, with suggestions of their own as to improvements, these reports to be laid before a higher committee, composed of one from each district, who would discuss the reports of the sub-committees, and from them be enabled to draw out special rules for Parliament to legislate upon, and to appoint inspectors, or whatever machinery they thought fit for the working thereof. May be, they might think fit to include more than ventilation in their interference; but these committees, from their local knowledge, would enable the central committee (if we may so term it) to form such rules as were needed, and would, I am convinced, be productive of much good. I do not think it argues anything, that although they have Government interference with mines on the continent, that their mines are behind ours. Try it in England, and it will be very strange indeed if the intelligent coalmasters and viewers cannot advise such rules as to make the ignorant or niggardly ones mend their doings.—STEAM: Blaenavon, Feb. 26.

#### GOVERNMENT INTERFERENCE IN MINES.

SIR,—Although this subject has so often been canvassed in your Journal, and so many able arguments brought forward bearing on the question, that scarcely any new facts can be added, yet, the excitement caused by the late deplorable accident at Darley Main, and the immense sacrifice of life on that melancholy occasion, induces me to trouble you with a few remarks. All parties now seem of the unanimous opinion that some independent supervision is necessary, both to protect the interest of the proprietor and the life of the workmen. It is strange, that while so many enactments have been passed, regulating all other branches of industry, that the mining interest, which may be called one of the sinews of the empire, has been entirely neglected. In every country in Europe, with the exception of England, where there are mines, there is a special code to regulate them, and competent examined officials to see the regulations, imposed by those laws, carried into effect. In your last week's number I have read the report of Mr. S. Trevenhere, on the laws which are in force in Germany, and cannot but agree with your opinion that it will not be difficult for Government to introduce such a modification of those regulations, which will protect the labourer, without vexatiously interfering with the proprietor. In the Scandinavian peninsula, the mines are all under the control of the Minister of Finance, the whole country is subdivided into mining districts, each under the supervision of a bergmaster, who is assisted by a deputy (ge-

schworn). Their duty is to grant sets, to settle all disputes as to dues and rights between the discoverer of the mine and the owner of the soil; at certain portions of the year to inspect the mines, to see that a proper system of ventilation is kept up, that it is properly timbered, and all loose ground so well secured that the life of the labourer is not endangered. All disputes between the proprietor of the mine and his workpeople must be laid before the bergmaster, previous to any litigation in the law courts. No weights or measures are allowed, except those issued by him or his deputy; he is bound, when called upon, to assist gratuitously with his advice as to the working of the mine, but in no case, except where he supposes the lives of the workmen to be in jeopardy, can he interfere. There are a number of other regulations, regarding schools, poor-rates, medical assistance, &c., which might be adopted here; but, as these would require many modifications, I shall not at present further allude to them. The great obstacle in appointing a competent Government inspection in England would, I apprehend, arise from the difficulty of selecting independent and qualified men to act as inspectors. The men selected for such a commission should be sound practical men, who have been connected with the working details of mining, and possessed of a competent theoretical knowledge of all matters appertaining thereto. It would not do that scientific theorists of great name should be placed in these situations by their political friends, and thereby add another system of jobbery to those under which the country already labours. These officials should be active men, with such a salary that they could be independent of all private engagements, and devote the whole of their time to the interests of the district to which they were appointed.

I am afraid, however, that whatever inspection the Government may appoint, it will be found not to work well. The officers required to fulfil these duties should have some training, and a preparatory education, previous to their appointments: unfortunately the obstinacy and shortsightedness of our mining population has hitherto resisted all efforts to render them as well educated as their continental contemporaries. While an examination is required in all other professions as to ability and knowledge, the miner, who has the charge of valuable property, and the lives of some hundred individuals in his care, has no other control than the caprice of the owner of the property, who may either be an ignorant, incompetent, or avaricious man, caring nothing for the moral or physical wants of his labourers, but solely seeking, regardless of human life, to work his property at the cheapest possible rate. Before any virtual good can be effected, it will, I conceive, be necessary that a complete revision of our mining code should take place, and that our agents should, one and all, receive some sort of an examination which would give the people a guarantee that they were, in some measure, competent to the duties which they professed to perform. I am aware that this cannot immediately be done—almost a generation must pass away. It is not probable that those who have been brought up under the present system would desire any change, but we will hope that with the march of progress the mining population will advance, instead of, as hitherto, remaining stationary, and obstinately attached to their old prejudices and antiquated notions. To have a competent inspection, the officers must be selected from the working classes; and to make them capable of fulfilling the onerous and responsible duties which will devolve on them, the greatest and primary consideration is to educate them.—DELTA: March 1.

#### EXPLOSIONS IN COAL MINES.

SIR,—Independent altogether of the non-effect of Government inspectors in preventing explosions in coal mines, their interference with private property will be a very delicate matter. The least power they can have is, to be able to suspend the working of a mine, if they consider it unsafe, until the opinion of disinterested parties be taken. Now, in the case of an iron-works, dependent upon a regular daily supply of coal, this will be a most serious interference, as it will have the effect of unhinging every part of the works; and, if afterwards found to have been done needlessly, it certainly will be anything but gratifying to the proprietors, or to the people employed under them; the same remark, of course, applies to collieries. Interference with agents will also lessen their responsibility; and it certainly cannot be supposed that the workmen will have the same confidence in occasional visits from an inspector, as they will have in men who daily share the same risks as themselves. One of your correspondents suggests a board of examiners, and that no person be given charge of a colliery, until proved by such board to be properly competent. Now, have not the most disastrous explosions happened with the best colliery viewers? Who had greater loss of life in that way than the late Mr. J. Buddle; and was there his equal as a practical coal viewer in the trade? I repeat my opinion, inserted in the *Mining Journal* upwards of 12 months ago, that what we want is a light which can be used with impunity in an explosive mixture; and the electric light seems to offer all that can be wished for.—A NEWCASTLE COLLIER: March 7.

#### GOVERNMENT INSPECTION OF MINES.

SIR,—The recent calamity at the Darley Main Colliery has induced many of your correspondents to suggest the adoption of various measures for the prevention of similar accidents, and to express their opinions as to the necessity for, or inexpediency of, a Government inspection of mines. Some of the remedies proposed are, doubtless, of great practical value; others are of a more equivocal character; and a few bear stronger evidences of good intentions than an intimate knowledge of mining operations. All of your correspondents have confined their attention to explosions only, and appear to have overlooked the important fact, that however destructive and appalling these accidents are, yet it is to other less obtrusive, but constantly occurring causes, that the greatest number of violent deaths are to be attributed. In the interesting and valuable "Analysis of the Causes of Deaths in Mines," as recorded in the *Mining Journal* from the 1st January to the 31st Dec., 1848, which is given in your last Journal, it appears that, whilst 162 men were killed by explosion, 304 lost their lives in the shafts and mines from other causes. This record is necessarily very incomplete and imperfect, from the difficulty there is of obtaining the requisite information, and is far short of the real amount of those annually killed in the mines of the United Kingdom. Had it included the whole, there is no doubt but that the number destroyed by falls from the roofs, accidents in the shafts, &c., would have been shown in a much greater proportion. As it is, however, it appears that 141 were killed by falls from the roof, &c., 140 in the shafts, 13 by suffocation, and 10 by the trams or waggons; whilst 162 men and boys were destroyed by explosion. By briefly recurring to the probable causes of these accidents, it will be seen that a considerable diminution of them may be reasonably anticipated as the result of instituting an efficient system of Government inspection.

1. *Explosions*.—The combined causes of the explosions in Ardsley Main, Eaglesbush, and Darley Main Collieries, by which 163 lives were lost, were imperfect ventilation and insufficient care in the use of the lights.

The remedy is obvious. Although explosions have, doubtless, occurred in well-ventilated collieries, and where the lights have been used with great circumspection; yet this is no reason why the ventilation should be neglected, and caution as to lights disregarded; for it is universally admitted, that the best safeguard against explosions is a good ventilation. Without discussing the various means which may be resorted to for this purpose, it may be sufficient now merely to say, that the state of a mine in this respect may be easily ascertained, and the best remedies for its improvement, if necessary, might be suggested by a Government inspector, and adopted by the coalowner with a very beneficial effect.

2. *Falls from the Roofs, &c.*—It is not saying too much, in attributing the majority of deaths from this cause to the insufficient supply of timber, nor are proofs wanting confirmatory of this opinion. That it is quite probable that accidents of this kind may happen even with the most liberal allowance of "props," is admitted, yet it is equally certain that they would be much less frequent, and much less disastrous, were the requisite quantity always supplied, and judicious care observed in placing them. In such cases inspection would be equally efficacious for the prevention of accidents.

3. *Accidents in Shafts*.—Like most other mining casualties, it is scarcely probable that these could be altogether avoided; but there is no doubt but that many lives might be saved, were cautionary and preventive measures always strictly observed. The absence of these would be easily observed by the inspector, and greater care made obligatory.

The same remarks equally apply to other miscellaneous causes of violent deaths; and in all there can be no reasonable doubt that great good must result to the miner from a periodical inspection—not only in diminishing the risks of sudden death, but by increasing the safety of his place of work, and avoiding the frequent fractures of limbs and bodily contusions to which he is now exposed. The most strenuous advocates of



Government inspection have never contemplated that fatal accidents would be altogether avoided on its institution, but that they would be very considerably diminished in number, whilst the health and comfort of the miners would be greatly increased. The necessity there is for such a measure is becoming daily more apparent, and its staunchest opponents are less positive in their objections to it; whilst its practicability and beneficial tendency has been strongly elicited and confirmed by the discussions which have taken place.—J. RICHARDSON, C.E.: *Neath, March 5.*

#### ACCIDENTS IN MINES—LEGISLATIVE INTERFERENCE.

ANALYSIS OF DEATHS BY ACCIDENTS IN MINES, RECORDED IN THE "MINING JOURNAL" DURING THE YEAR 1848.

	Explosions	Breakage of ropes	Falling down shafts	Falling from coal, roofs, &c.	Suffocation	Waggon accidents	Tram accidents
North and South Wales	43	22	6	39	5	1	1
Lancashire	24	10	13	9	0	3	3
Staffordshire	35	28	24	65	3	0	0
Cornwall	7	4	16	8	0	0	0
Derbyshire	2	0	1	13	0	0	0
Durham	16	4	1	2	2	6	6
Northumberland	3	1	0	3	0	0	0
Shropshire	2	0	0	3	0	0	0
Cumberland	30	1	1	1	1	0	0
<b>Making a total of casualties of</b>	<b>162</b>	<b>78</b>	<b>62</b>	<b>141</b>	<b>13</b>	<b>10</b>	<b>10</b>

Sir,—The above analysis, published in your paper of last week, furnishes, in my opinion, an ample subject for reflection with respect to Parliamentary legislation. I will, therefore, submit my views to your readers in a few short observations. In the first place, I will premise that the collieries in the north of England employ considerably more persons than those of any other coalfield; that the shafts are deeper and the workings much more extended—the quantities of coal raised, and the speed of the machinery, far exceeding those of any other district; also, that the coal produces a much greater quantity of inflammable gas; and that from these accumulated facts the ratio of deaths by accident ought to be proportionately greater in Durham and Northumberland than in any other district. But how stands the case? During the year 1848 only 19 were killed by explosions, 5 from breakage of ropes, 1 from falling down shaft, 3 from falls of coal and stone, 4 from suffocation, and 6 from trams or waggon—in all, 38 persons.

Now, let us assume that the districts of Durham and Northumberland are equal in importance to North and South Wales, Lancashire, and Staffordshire, we have there killed by explosion 102, breakage of ropes 60, falling down shafts 43, falls of coal and stone 113, suffocation 8, and by trams and waggon 4—in all, 330: being nearly 9 times the number of persons killed by violence than in the deep and dangerous collieries of the north. It may naturally be asked, how does this happen? and that is the question I have undertaken to solve.

First, then, the collieries of the north of England are all managed directly by viewers and agents employed by the owners, who have no personal interest to militate against their duty of maintaining good machinery, and of providing ample materials and attendance for the workmen—the said viewers being more practical and scientific than many managers of collieries elsewhere, as, from the comparative smallness of the works, there does not appear that necessity to employ scientific men—hence many persons are intrusted with the management of collieries, who do not at all understand the subject. So remarkably different is the policy of conducting the northern collieries to those of other districts, that there is not throughout the northern coal-field one single butty collier, or contractor; but the works are prosecuted with a due regard to permanent well-being, as well as for immediate effect.

On the contrary, in many of the southern coal-fields, the working of the pits, the supplying of materials, and the dealings with the workmen, are let to contractors, or butty colliers, who raise the coal by the ton; and as these persons have only a temporary interest in the work, they naturally save at all points—hence may be attributed the numerous deaths produced by deficient timbering, neglect of lamps, bad ropes and chains, deficient machinery, and the employment of boys and women about the top of the shaft—many of whom are killed by falling down.

Now, under this statement of facts, does it not furnish a most powerful argument in favour of Parliamentary interference, whereby the safe and surpassing arrangements of the north would be gradually transplanted into other districts, partly by persuasion, and partly by compulsory power, to enforce the supply of good and adequate materials for the preservation of the lives of the miners, as well as for the more economical and effectual working of the mines: and is not this statement well calculated to allay the fears, and to smooth down the few existing prejudices of the north county coal-owners, as to the consequences of legislation; for, according to the foregoing statement, they are so far in advance of their brethren in other districts, that legislation would (except in isolated cases) be virtually inoperative in regard to their collieries. The frightful list of persons killed from the falling of coal, &c., in the Staffordshire thirty feet coal—viz., sixty-five—calls for especial observation; it arises from the practice, greatly to be objected to, of working away the coal by one single process, during which it is impossible to make use of timber as in ordinary mining, hence the continual loss of life occasioned by the unexpected fall of coal or stone. Notwithstanding the almost universal practice of this system, and an opinion that, under proper experiments, it would be shown that the working of this seam by two separate processes would be much more advantageous to both landlord and tenant, and most assuredly be a great saving of life; such experiments might be induced under the influence of intelligent inspectors, but experience shows it is next to impossible to bring about any such trials, under the bare suggestions of uninfluential persons.

Since the recent dreadful accident in Yorkshire, various new projects have been again launched by theorists, and, amongst the rest, an exhibition has been made before numerous Members of Parliament, and other enlightened persons, at the London Polytechnic Institution, of Mr. Gurney's steam apparatus for increasing ventilation; but, whatever may be its merits, how very difficult is the introduction of any new and costly system without the aid of Government, or Parliamentary patronage. Throughout the thick coal collieries of Staffordshire, the common furnace, which is so familiar in the northern mines is, generally speaking, disregarded; so that collieries being unprovided with this—the most simple of all artificial helps to ventilation—if producing the smallest quantity of gas, will naturally, sooner or later, explode; yet to induce any rapid change of system is well known to be utterly hopeless, without authoritative interference.

Newcastle-on-Tyne, March 7. —MATT. DUNN.

#### THE NEW MINE VENTILATOR.

Sir,—Having had an opportunity yesterday of carefully inspecting Mr. Struve's new mine ventilator, whilst it was in operation at the Eaglesbush Colliery, near Neath, the following observations upon it are submitted to such of your readers as are interested in this important subject. This machine has now been three weeks in full operation, and the unequivocal success which has attended it is a matter of sincere congratulation, not only to the talented inventor, but to all engaged in mining. Its beautiful simplicity of design, its easy adaptation to the peculiar circumstances of any mine, and its certainty of effect, are its chief characteristics; whilst the comparatively small amount of capital required in its construction, and the slight annual expense incurred by it, are strong recommendations for its general adoption. It is well known, that in the best managed collieries recourse is had to the furnace as a means of ventilation—not because it is perfect, but as the best system known. Without entering into a description of this mode, with which most of your readers are familiar, it will, perhaps, be sufficient to mention some of the most serious objections to it, and see how far they are remedied, or avoided, by this invention. The efficiency of the furnace depends solely on the difference of temperature between the downcast and upcast shaft, and is, therefore, seriously affected by thermometrical changes; whilst the prevalence of fire-damp in a mine is increased, or diminished, by the less or greater pressure of the atmosphere, as indicated by the barometer. It is also subject to interruption by the occurrence of foggy and windy weather, as shown in the evidence of Mr. Wood at the recent inquest at the Darley Main Colliery. The difficulty there is of promptly increasing the ventilating power of the furnace when the necessity for it arises, as well as ensuring a vigilant and proper attention to it on ordinary occasions, disadvantageously limits its capacity, and leaves the fate of the miners in a fiery pit at the discretion of a man whose inexperience, or even unintentional neglect, would be fatal to them all. Where the upcast is used as the drawing shaft, the rapid destruction of the ropes and chains constitutes not only an item of great annual expense, but is also an element of increased danger to the workmen. The iron tubing and the brattices in an upcast furnace pit also have to be renewed much more frequently than in the downcast shaft; whilst the men are exposed to the assembly of inhaling the noxious fumes and vitiated air through which they are obliged to pass in going to, and returning from, their work. In the absence of any plan by which these evils could be removed, and the advantages otherwise resulting from the use of the

furnace retained and increased, there has naturally been a disinclination to abandon the ascertained benefits of the furnace, even although accompanied by these drawbacks. In the several schemes which have hitherto been suggested as improvements, their merits have not been commensurate with the risks consequent upon a change of system; whilst the existing evils would only have been modified, or partially mitigated, by their adoption. By Mr. Struve's machine all the advantages resulting from the use of the furnace are retained and augmented, additional benefits are secured, the evils complained of are removed, and are not replaced by others; at least, such is the opinion of the writer, who devoted a day to the careful examination of it, and its effects, both above and underground, and who is uninfluenced by any partiality arising from pecuniary interests, or connection, with either the inventor, or the proprietors of the colliery.

By referring to the annexed plans, section, and description of the machine now in operation at Eaglesbush, and to a general plan and more detailed description which appeared in your Journal of Dec. 11, 1847, all of which are by Mr. Struve, your readers will be able readily to understand the construction of the ventilator, and the mode of its operation. The machine could have scarcely been tried under circumstances more unfavourable to its success than in this instance, for independent of the additional friction caused by drawing a large quantity of air through ways of little more than 11 ft. area, owing to the men having been watered out of that part of the mine, where the principal works have recently been carried on, it was found needful to change the direction of the air-ways, and in consequence, it is at present conducted through temporary passages, which are ill-calculated for such a purpose, and which permit an immense leakage of the air into the waste parts of the colliery. The enlargement of the areas of the upcast shaft, which is now only 3 ft. diameter, and of the air-ways is now in progress, which, when completed, will materially add to the effective performance of the machine. The engine, too, is an old one, and has been injured by long exposure, is less than half the power necessary to work the machine to its full effect, and is of the old construction. Yet, under all these disadvantages and impediments to the development of its powers, the machine worked steadily at 74 strokes per minute. The diameter of the aerometers is 12 ft., and the length of stroke 4 ft.

Therefore, 12 ft. diameter = 113 ft. area  $\times 2 = 226$  ft. area  
and 4 ft. stroke  $\times 74 = 298$  strokes per minute  $\times 60$  ft. velocity

= 13,560 cubic ft. of air drawn

out of the mine per minute. The greatest quantity of air passing through this mine previous to the erection of this machine was 3000 cubic feet per minute, whilst this machine, if worked to its full extent, is capable of drawing 40,000 cubic feet per minute. By increasing the diameter of the aerometers to 18 ft., then 70,000, and if to 24 ft., then 125,000 cubic feet of air per minute would be drawn out of the mine, provided the engine-power was also increased. No sooner was the machine set to work, than its effects were immediately felt in every part of the mine; stalls in which the fire-damp was so prevalent that it required the utmost caution to be used even with the Davy lamp, the cylinders of which were so heated as to require to be frequently taken into another part of the mine to be cooled, were cleared of this dangerous enemy as if by magic, and all indications of the presence of fire-damp vanished—indeed, so effectually has the machine removed all apprehensions of danger, that naked lamps and candles are now substituted for the safety-lamp. Even the waste parts of the mine, which are at a considerable distance from the direct course of the air-way, and which were so foul and fiery, as to render the introduction of even a safety-lamp into it very hazardous, were unexpectedly, and to the astonishment of the men, completely cleared. The abandoned stalls, which have hitherto been magazines of explosive air, can now be entered with safety with a candle, and the whole atmosphere of the mine is so much improved and purified, that according to the concurrent testimony of both masters and men, a collier can now cut 3 tons of coal with less fatigue than he could previously cut 2 tons. The effect of the machine in clearing the colliery of noxious vapours is plainly indicated by the offensive odour of the air discharged from it, and by the fact observed yesterday, of a dense volume of powder smoke issuing from the outlet valves of the machine, almost immediately after the discharge of a blasting shot in the mine. When the ventilator was first put in operation, the furnace, which is situated at a short distance from it, in one of the air-tunnels on the surface, was also in action, when, with almost the first motions of the pistons, the fire was swept off the bars, and the red-hot clinkers carried along the inlet passages to the aerometers—a fact clearly illustrative of the superior draught of this machine, as compared with that caused by the furnace.

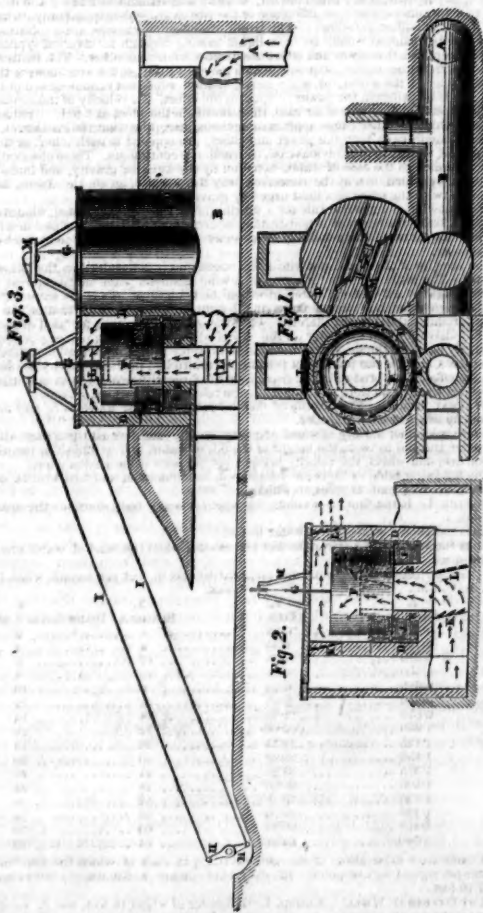
Other facts, confirmatory of what has been stated, might be added; but, it is presumed, sufficient has been said to prove that, although tried under great disadvantages, yet the success of this new mine ventilator has been unequivocally demonstrated; and that, with the slight improvements which experience may point out as expedient, this mode of ventilating mines will constitute a means far superior to the furnace, high-pressure steam, or any other mode which has hitherto been attempted.

It will be seen, on a reference to the plans, that it is perfectly unaffected by the thermometrical and barometrical changes in the atmosphere; that it is capable of being so constructed, as to double or treble the quantity of air ordinarily required, on the occurrence of a diminished pressure of the atmosphere, or on other emergencies; that its effective operation is unimpeded by fogs or wind; that it constitutes an air-gauge, indicating the quantity of air at any time passing through the colliery, and gives immediate and unequivocal indications of the neglect of the man attending it; that it may be applied with facility to drawing as well as to other upcast shafts and levels, and thus effect a great saving of the expense now incurred by the rapid destruction of the chains, ropes, tubing, &c., besides diminishing the existing dangers caused thereby to the men.

These, Sir, are a few of the benefits which will result from this valuable invention; to which may be added its easy adaptation to the peculiar circumstances of any mine, without requiring any alterations in its internal works. The cost of erecting a machine of the same dimensions as that at Eaglesbush, independent of the engine power, is about 3000l., and it requires the attendance of only one man, consuming somewhat less than 2 tons of small coal per week—so that, to its other numerous advantages, cheapness of cost and a small annual expense is to be added. In many collieries there is sufficient spare power so as to render the erection of an engine for this purpose unnecessary, and where this is not the case, 2000l. will amply provide the requisite power.

It is highly gratifying to Messrs. Penrose and Evans, the proprietors of Eaglesbush Colliery, that their efforts to improve the ventilation of their valuable mine have resulted in such signal success, and converted one of the most dangerous into one of the safest collieries in the district; and it is to be hoped that their laudable example in providing for the comfort and safety of the numerous men in their employment will have a beneficial influence on other coalowners, whose mines are in a dangerous state from imperfect ventilation.—J. RICHARDSON, C.E.: *Neath, March 7.*

#### STRUVE'S PATENT VENTILATING APPARATUS.



#### DESCRIPTION OF THE ENGRAVING.

- Figures 1, 2, 3, are a plan—section and elevation of the mine ventilator.  
A—presents the upcast pit, which may be either the coal or pumping pit.  
B—engine, 5 feet by 6 feet, connecting the upcast pit with the mine ventilator; thus an uninterrupted communication is established with the whole of the air passages of the colliery.  
C—D—two cylinders of masonry, 14 feet interior diameter, and 16 feet long.  
E—E—interior cylinders, 9 feet 6 inches long, and 4 feet 6 inches diameter; the space between the cylinders is filled with water, 7 feet deep, and marked J.  
F—F—are two aerometers, of 12 feet in diameter, and 8 feet 6 inches long, made to balance each other, and to move vertically in the water, by means of guides.  
G—connecting rods, with the chains from the crank shaft, and which also serve as guides.  
H—two cranks, placed in opposite direction on a shaft, and to which an engine is attached, to give them a rotatory motion.  
I—I—two chains connecting the cranks with the aerometers, and giving a vertical motion to the aerometers.  
K—K—four sets of inlet valves, to admit the air from the mine.  
L—L—four sets of outlet valves, for the discharge of the air into the atmosphere,

M—is the framing, which supports two shelves, of 2 feet in diameter, over which the chain moves, and which have to support the whole weight of the aerometers.  
N—embankment formed from the cuttings of the foundations.

The operation of the machine is as follows:—A steam-engine, or other power, gives a rotatory motion to the shaft and cranks, H, I, and, by means of the chains, I, I, a reciprocating motion is given to the aerometers F, F, equal to twice the length of the cranks; in this case the machine can work at four or six feet stroke: the aerometers balance each other, and descend by their own weight—the lower inlet valves opening at the same moment as the upper outlet valves, a rapid passage of air takes place through the pumps.

The water forms the packing, or hermetical seal, which prevents air escaping, or being admitted, except through the inlet or outlet valves; this machine is capable of discharging 40,000 cubic feet per minute, when moving at the rate of 200 feet per minute, and there is no reason why it may not be worked much faster. The machine is moved by a 5-horse power high-pressure engine.

#### STRUVE'S MINE VENTILATOR.

Sir,—Will you permit me to make public through your journal the enclosed testimonial, which I have this day received from Messrs. Penrose and Evans, relative to my patent mine ventilator, which has been lately erected at the Eaglesbush Colliery. I refrain from any comment, preferring that the testimonial and the mine ventilator should speak for themselves.—WILLIAM PRICE STRUVE, C.E.: *Swansea, March 5.*

"DEAR SIR,—Your Patent Mine Ventilator has now been at work at our colliery for a month, and gives us perfect satisfaction. In our case not only is the gas and foul air drawn from the stalls and general workings of the mine, but the gas and steam from abandoned parts are likewise kept clear. Our men now all work in their stalls with naked lamps. We work the ventilator from about five in the morning, till six in the evening, it being unnecessary to work it at night, as on entering the mine in the morning, the overman takes a Davy lamp with him, and however much of gas there may be there, it is immediately drawn off on the working of the ventilator. Our men say that the mine is now cool, and wholesome to work in, and we observe that they finish their labour in a much shorter time. The current of air underground is uniform, and quite independent of barometrical or thermometrical changes of surface. We are desirous to give facilities to any parties who may wish to have an opportunity of viewing the working of the machine.—PENROSE AND EVANS: *Eaglesbush Colliery, Neath, March 5.*

#### REMARKS ON LIGHTING COAL MINES.

Sir,—Feeling that some apology is necessary for addressing you again on the above subject, I shall now concisely give you my reasons for taking this step. My safety-lamps have been tried at several collieries; and while some parties have approved of them, and others have rejected them, yet no one has said that they are useless or unsafe. All admit that they give an excellent light, much better than they ever saw before in a safety-lamp, and yet some have picked out the most trivial objections, as almost to convince me that they are careless in the matter, and, sooner than go to a little expense and trouble in the onset, will still go on in the old way, and run the risk of explosions every hour. Now, as I am no caterer for public honours without doing something to deserve them, I was determined not to forsake the good cause of endeavouring to devise practical means to remove the poor colliers from all liability to death from explosions at this stage, but rather to investigate the subject further, with the hope of discovering a really good and safe plan of lighting coal-pits, which I might have no hesitation in bringing before Government, in order that the same (if approved of) might be enforced by law. The reason of my addressing you now is, that I may put you in possession of my whole system, as I have now framed it, together with a description of another non-exploding lamp. I proceed, then, to explain the details of my entire plan, to which I solicit your earnest attention; and this I do with great confidence in your impartiality and freedom from prejudice, hoping that, if you see it possible that benefits may arise from its adoption, you will use your influence to introduce it. Trusting, Sir, to your candour, I address you as a friend without reserve—believing that you understand my motives and appreciate my labours.

Having been diligently acquiring information for some months, I am enabled pretty clearly to see the position in which things stand, with reference to the working of coal-pits. Some proprietors are so miserably near and stingy, that they will go to no extra expense in properly ventilating their pits; nor will they listen to any plans proposed to them. Others do not object on the score of expense, but upon pretence that all things are arranged right, and that no reform is necessary. Some make these objections from ignorance; others, from apathy and indifference. From these three classes of persons, I am glad to say, that many are willing to adopt any judicious measures, when proposed to them, for the purpose of lessening the danger. Now, it is to these last gentlemen that I particularly address myself, well knowing that the others cannot be convinced by any argument; but my hopes are, that some few may give attention to my suggestions, and may put them in practice, and that afterwards other coalmasters may be induced to follow their example. But I candidly confess, that I fear not much good will be done by the Government taking up the matter, and enforcing, under heavy penalties, some safety system. I am proud to observe, that other individuals, besides me, are beginning to see the cause, although some have more philanthropy than ability, judging from the comical safety-lamps described in some of the provincial papers.

I propose that, after my lamps and safety system have been tried, a bill be brought before Parliament—supposing they be found to answer—having for its object the prevention of gaseous explosions in coal mines. Its provisions should be—the appointment of Government inspectors to examine all the collieries in the kingdom, and to report whether the safety-lamps were exclusively used at all times, and in all parts of the mine; and whether the managers of collieries where safety-lamps were not used—were liable to heavy penalties infringing the rules, and endangering his own and other's lives by improperly using his lamp, by smoking or by any other improper conduct—to punish for manslaughter, or homicide, the proprietors of coal mines where accidents have happened through want of proper instruments and regulations—to punish in like manner any of the colliers by whose carelessness an explosion is caused, if they survive it, when it can be proved that lamps for every miner were provided, and proper regulations made by the managers—in all cases to enable the law to lay hold of and punish the real guilty party causing the explosion, whether master or man; and, lastly, to recommend the best method of ventilating coal-pits, and to enforce the same in like manner as the use of safety-lamps. The preceding bill is framed in accordance with the following principles, or, as I term them, axioms:—1. That to prevent explosions of fire-damp, or carbonated hydrogen gas, it is necessary that safety-lamps be used in every pit, and that neither naked candles nor naked oil lamps be used therein; and that doing this, and appointing proper superintendents to take care of the lamps, explosions may be prevented, and future generations know of them only by report.—2. That where safety-lamps are exclusively used in coal-pits, explosions would not be caused from insufficient ventilation, whether caused by neglect of the trappers, or by want of a proper system; and that, therefore, it is of primary importance now (seeing that so many pits are in a foul state) to introduce the general and exclusive use of safety-lamps for lighting all pits; and that, consequently, ventilation is of secondary and subordinate consideration to a proper mode of lighting coal-pits—not only in foul pits, but also in the purest—for I suppose there are no pits that are always free from inflammable gas, or that are not sometimes liable to it.—3. That it is better, in all points of view, to enter the subject, and to make regulations, to prevent the occurrence of explosions, than to punish after their occurrence—just as any one of us would rather prevent himself being killed, than take measures for punishing our murderers; and that it seems advisable to oblige all coalmasters to pursue a safer system of lighting their pits, rather than to leave it to their own free will. (But I will observe, that it will be much more humane and honourable for masters to alter the system voluntarily, than to wait to be compelled to do so).—4. That it is as necessary to frame a system for the guidance of colliers, and to enforce the same, as it is to invent safety-lamps. Since it is evident, in all accidents, that the subject, the man, the safety-lamps are generally and carefully used, there is no safety at all; or why is it that since 1816, when the Davy lamp was first constructed, several thousands (I do not know the exact number) have been sacrificed? And, lastly, that, looking at the importance of the subject—the number of lives that are daily endangered, and the fact, that Government interferes in far less important matters—there seems no solid objection to Parliamentary enactments in this instance. And now, a few words with reference to the Davy lamp, and the reasons that induced me to take up the matter. My simple desire is to put a stop to all explosions; I do what I can personally, and leave the rest to those concerned. The almost hideous occurrence of explosions for years, is a fact too notorious to be concealed from any observer; it struck me forcibly, and made an impression so deep, that it will never be obliterated, and is strengthened by every fresh accident. I then inquired into the causes of these awful occurrences; and was at first inclined to think that they were violations of a higher power than we can control, knowing their frequency; but I discovered that there were means of preventing them, and that they occurred solely through negligence. It then seemed to me very strange that miners should throw away their lives so profusely, when the remedy was attainable, and I determined to dive deeper into the subject, with a view of understanding it thoroughly, and discovering with whom the blame rested. I was informed that if a lamp, called a Davy lamp, were used, scarcely ever would explosions happen. Why, then, thought I, is it not more generally used? For two reasons—firstly, that it is not a convenient lamp to work with; secondly, that the masters did not provide a sufficient quantity for the men's use. Having discovered the objections, I then set to work to remedy them. Rules for the guidance of the masters I have already laid down. I have designed safety-lamps that afford a good light, with whose construction you are already acquainted. But then they, as well as the Davy lamp, are costly, and, therefore, they cannot afford to have them. Strange excuses these, by gentlemen who spend every day in luxurious superfluities enough to supply a whole colliery with safety-lamps! Nevertheless, I was determined to conquer this objection, and I do think have succeeded, since my new colliers' lamp, called "the cylinder lamp," can be made for as little as 1s. 3d. each. I thus openly, Mr. Editor, give you an account of my labours—the causes that led to them, and the results produced by them. You will observe, that I have endeavoured to attain two objects—one, to establish the necessity of some sort of safety light being exclusively used in coal-pits; the other, to design safety-lamps that should be answerable for the purpose. Let proper lamps be introduced into collieries, and a proper system of management will soon follow. No one acquainted with the matter can deny, that it is cheaper to burn oil than candles. I assert further, that the saving effected by the exclusive use of oil lamps in pits, will soon repay the original cost of the lamps. The safety system I recommend, then, possesses the advantages of economy in the long run, although I consider that advantage only secondary.

My safety lantern and lunar lamp are very suitable to be used in the roomy galleries of pits, where many men work together, because the light from one of them will illuminate a large area. They can also be advantageously used in all cases where much light is required, and are particularly to be recommended to gentlemen when about to examine, survey, or to descend into mines from curiosity. They also can be secured from interference on the part of the working colliers by being locked, and by proper persons being appointed to attend to them. When the candle is consumed, which will happen in a space of time proportionate to the size of the candle, or when the oil lamp requires trimming, which cannot be done in the lunar lamp without opening, the lamps can be taken into a safe part of the mine, where necessary for doing this and lighting are kept. Here, then, is a simple, but effective, system, that may be adopted in many cases with good effect. Now, we may consider this problem solved—viz., that it is possible to make safety mining lamps that shall emit a good light; and thus it is one objection to the Davy lamp and its limitations removed. I have also fully proved, that the use of plate-glass is attended with no risk, provided that the lamps are properly constructed; and, also, that plate-glass lamps will emit, or send forth, more light than wire gauze ones, whatever lighting apparatus be employed. I have satisfactorily discovered that a great flame cannot be obtained in a safety-lamp constructed on the wire gauze principle, unless the smoke be all consumed inside the lamp; because it is an irrevocable law, that only a







